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SOME RESULTS OF THE FLORIDA
CURRENT STUDY
15 May 1953 to 15 November 1953

A Technical Report
February 1954

to

The Office of Naval Research
Contract Nonr0840(01)



CORAL GABLES, FLORIDA

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THE MARINE LABORATORY
University of Miami

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TROPICAL OCEANOGRAPHY

by

Ilmo Hela, Frank Chew, and Lansing P. Wagner

Coral Gables
Florida

F. G. Walton Smith
Director

ML-6787

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SOME RESULTS OF THE FLORIDA CURRENT STUDY
15 May 1954 to 15 November 1953

ABSTRACT

This report consists of observations made in the Florida Current from 15 May to 15 November 1953. Two papers are included, one relating the velocity pattern with increase and decrease of transport with time; the second illustrates the effect the tide seems to have on the velocity pattern and also demonstrates the possible existence of internal waves. Included in this report are comments on the observations made and tables of the observations.

INTRODUCTION

The type of work that has been pursued for the period of 15 May to 15 November 1953 has been practically the same as previously accomplished under this contract. Fourteen cruises in Florida Current were made. Temperature-depth records were made with bathythermographs and in connection with the regular hydrographic stations, with reversing thermometers. Surface currents were measured by means of the Geomagnetic Electrokinetograph. Mean current velocities were determined by the total set of the ship during the transects whenever this was practical. A mean "K" factor for the GEK measurements was determined. More work was devoted to hydrographic stations than had previously been done. Aside from the usual transects of the Florida Current, transects were made between Alligator Reef and Cay Sal Bank, Riding Rock and Miami, and Lake Worth and Settlement Point, Grand Bahama I.

In addition to the transects completed hydrographic observations were made in one position to cover a semidiurnal tidal cycle. Also further observations along the convergence area on the western edge of the Current were made. Work on a buoyed recording current meter was accomplished but only trial records have been made during its calibration due to technical difficulties in the instrument. Permission from the Army Engineers and Coast Guard has been granted for buoying this instrument near the Miami Sea Buoy in an attempt to measure the changing current velocities and directions of the western edge of the Florida Current. The Cat Cay Tide Gage has continued in operation for this project, and records have been forwarded to the U.S. Coast & Geodetic Survey.

The Miami-Cat Cay transects were continued in the manner described in the semiannual report for 15 November 1952 to 15 May 1953 in an attempt to discover the gross seasonal variations in temperature that may or may not be related to transport and velocity variations. Analysis of the observations has helped to clarify the understanding of the relationship of current velocity pattern and mass transport (see Section A) and of the possible effects of the tides on the main current (see Section B). Section C of this report consists of graphic representations of temperatures, salinities and GEK current vectors with some comments. In Section D are tabulated (a) observations of the hydrographic stations and (b) pertinent information for all GEK fixes.

SECTION A

THE VELOCITY STRUCTURE AND THE TRANSPORT OF THE FLORIDA CURRENT: AN APPLICATION OF BJERKNES' EQUATION FOR STABLE INERTIAL OSCILLATIONS ALONG ISENTROPIC SURFACES

by

Frank Chew

The Marine Laboratory, University of Miami

INTRODUCTION

The meandering of the Gulf Stream in the ocean shares many characteristics with the meandering of the jet stream in the atmosphere. Haurwitz and Panofsky (1) on the basis of a simplified model conclude that the meandering of the Gulf Stream may occur when it leaves the "containing wall" of the continental border. A cause of meandering may be inertial oscillation of water particles along isentropic surfaces such that the oscillation may become unstable when the stream leaves its containing wall but must be necessarily stable when within its containing walls. The Florida Current between the Florida Peninsula and the Great Bahama Bank is thought to have stable inertial oscillations. On the basis of certain assumptions, J. Bjerknes (2) derived an expression relating the transverse speed component of the particles in stable inertial oscillation along isentropic surfaces to several measurable variables. For the Florida Current one of these variables was measured by C. K. Wertheim; his results are now in press.

This paper reports on a study of the Florida Current on the basis of Bjerknes' equation, Wertheim's transport values and surface velocity profile across the Florida Current as determined by the Geomagnetic Electrokinetograph (G.E.K.) developed by W. S. von Arx (4) and carried out by this Laboratory.

THEORY

Suppose the water particles in the Florida Current are subject to impulses moving them in the east or west direction along isentropic surface with a speed v_n which is superimposed on the general northward flow. With certain assumptions regarding the kinematic state of the particles and neglecting the frictional force and field acceleration, the magnitude and direction of these particles acted upon by impulsive forces are given approximately by the Bjerknes equation for stable inertial oscillation along isentropic surfaces:

$$\dot{v}_n = \frac{-\frac{\partial v_g}{\partial t}}{(2f + \frac{\partial v_g}{\partial n})} \quad (1)$$

where n is the magnitude of the vector pointing east in the direction of steepest downslope along an isentropic surface, v_g the geostrophic current and $2f$ the Coriolis parameter. For a right-handed coordinate system with the positive x -axis due eastward and on the assumption that the n -axis forms a negligible angle with the x -axis $\frac{\partial v_g}{\partial n}$ will be approximated by $\frac{\partial v_g}{\partial x}$. Integrating equation (1) from the sea bottom to the ocean surface and from one bank to the current axis, equation (1) becomes:

$$\iint v_n \delta x \delta z = \frac{-\frac{\partial}{\partial t} \iint v_g \delta x \delta z}{(2f + \frac{\partial v_g}{\partial x})} \quad (2)$$

where a mean value of the denominator has been used and taken outside the integral sign. The interchange of the local time change operation and the spatial integration is permissible since it is assumed that the time change of the current axis position is vanishing small.

Equation (2) is directly applicable to the Florida Current west of the current axis when one assumes that the Florida Current is geostrophic. For

the portion of the current from Miami to the current axis equation (2) states that when the total transport of the current west of the axis increases with time, the average transverse inertial movement along isentropic surfaces is toward Miami. When the transport decreases with time the direction of the inertial motion is reversed. Assume for the moment that this transverse inertial motion is confined to the west of the current axis, then transverse inertial motion towards the Miami side would decrease the slope of the sea surface and hence the geostrophic current. Similarly, transverse motion toward the current axis would increase the geostrophic current.

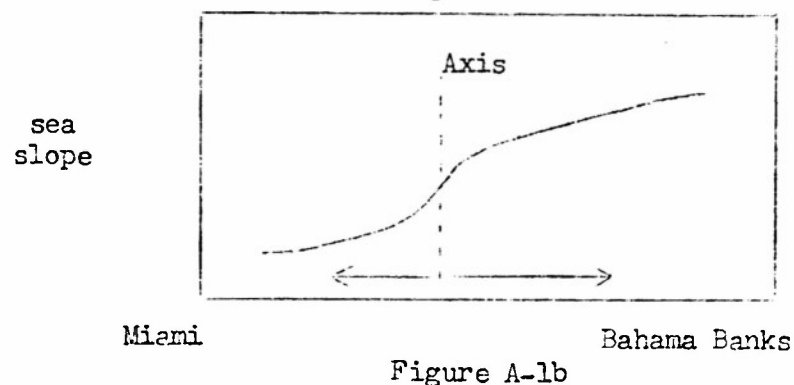
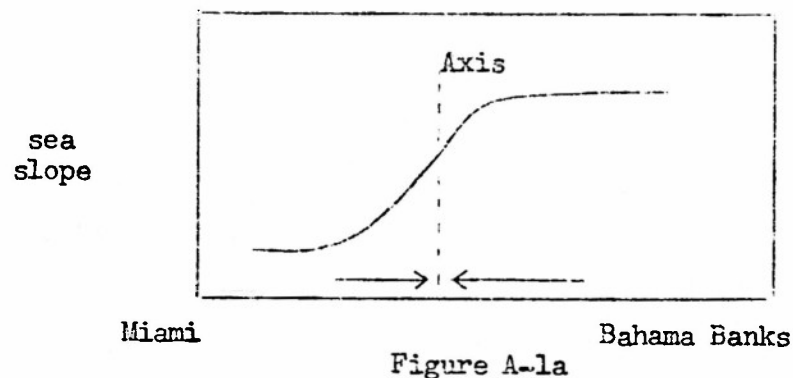
In the atmospheric circulation patterns are occasionally found where the magnitude of the anticyclonic shear in an air stream exceeds that of the local turning of the earth. The Florida Current, partly because of its low latitude setting, shares this characteristic and three GEK transects across the current have been found to contain anticyclonic shear of magnitude greater than $6.35 \times 10^{-5} \text{ sec}^{-1}$, the magnitude of the local turning of the earth for latitude $25^{\circ} 50' \text{ N}$. If it is assumed that these surface velocity profiles are also representative of the condition along the isentropic surfaces then equation (2) may take on a specialized form for application to the portion of the current east of the current axis:

$$\iint v_y \delta x \delta z = \frac{\frac{\partial}{\partial t} \iint v_g \delta x \delta z}{(\partial v_g / \partial x - 2f)} \quad (3)$$

Equation (3) states that when the total transport of the current east of the axis increases with time the average transverse inertial movement is toward the east while for a decrease in transport the average transverse motion is toward the current axis.

Suppose the transport east and west of the current axis increase or decrease simultaneously, then a decrease in transport will effect a trans-

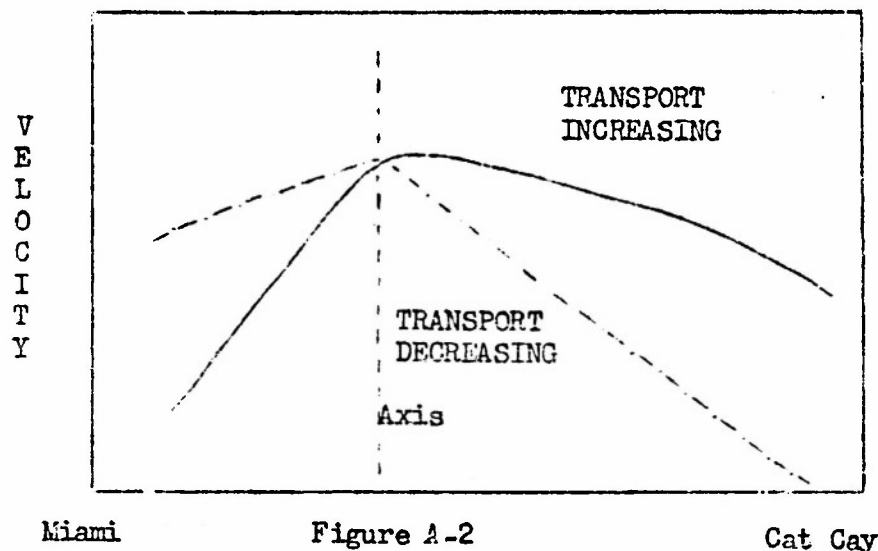
verse convergence at the axis as shown in Figure A-1a, while an increase in transport will effect a transverse divergence at the axis as shown in Figure A-1b. The axis appears as a line of minimum transverse exchange, so that in the case of convergence water is brought from both banks to accumulate near the axis and in the case of divergence water is taken from the axis and piled up at both banks.



From the geostrophic equation and equations (2) and (3) the following conclusions are derived:

- a. When the total transport of the Florida Current is increasing with time the speed profile across the entire current should tend to show a higher average current east of the current axis and a lower average current west of the current axis.
- b. When the total transport of the current is decreasing with time, the speed profile across the current should tend to show a lower average current east of the axis than west of it.

The conclusions are illustrated in Figure A-2.



APPLICATION

During the past year the Marine Laboratory made various GEK transects across the Florida Current. Coinciding with these transects Wertheim measured the time change of total transport of the Florida Current by a study of the electric potential between Key West and Havana. For the present application the sign of the local time change of the total transport of the Florida Current will be read off Figure A-3, which is a reproduction of Wertheim's Figure 2. A total of nine GEK transects are available for this study and they are summarized in Table I. Of the nine transects three have anticyclonic shear of magnitude greater than the local Coriolis parameter; equations (2) and (3) are strictly applicable to these. But the rest are included on the supposition that the anticyclonic shear along the isentropic surfaces is larger than is reflected at the surface.

The magnitudes of the anticyclonic shear were computed by taking the north components of the uncorrected GEK measured current at Long. 79 22' W and subtracting it from that at the current axis and then dividing the remainder by the distance between them. The result is finally multiplied by

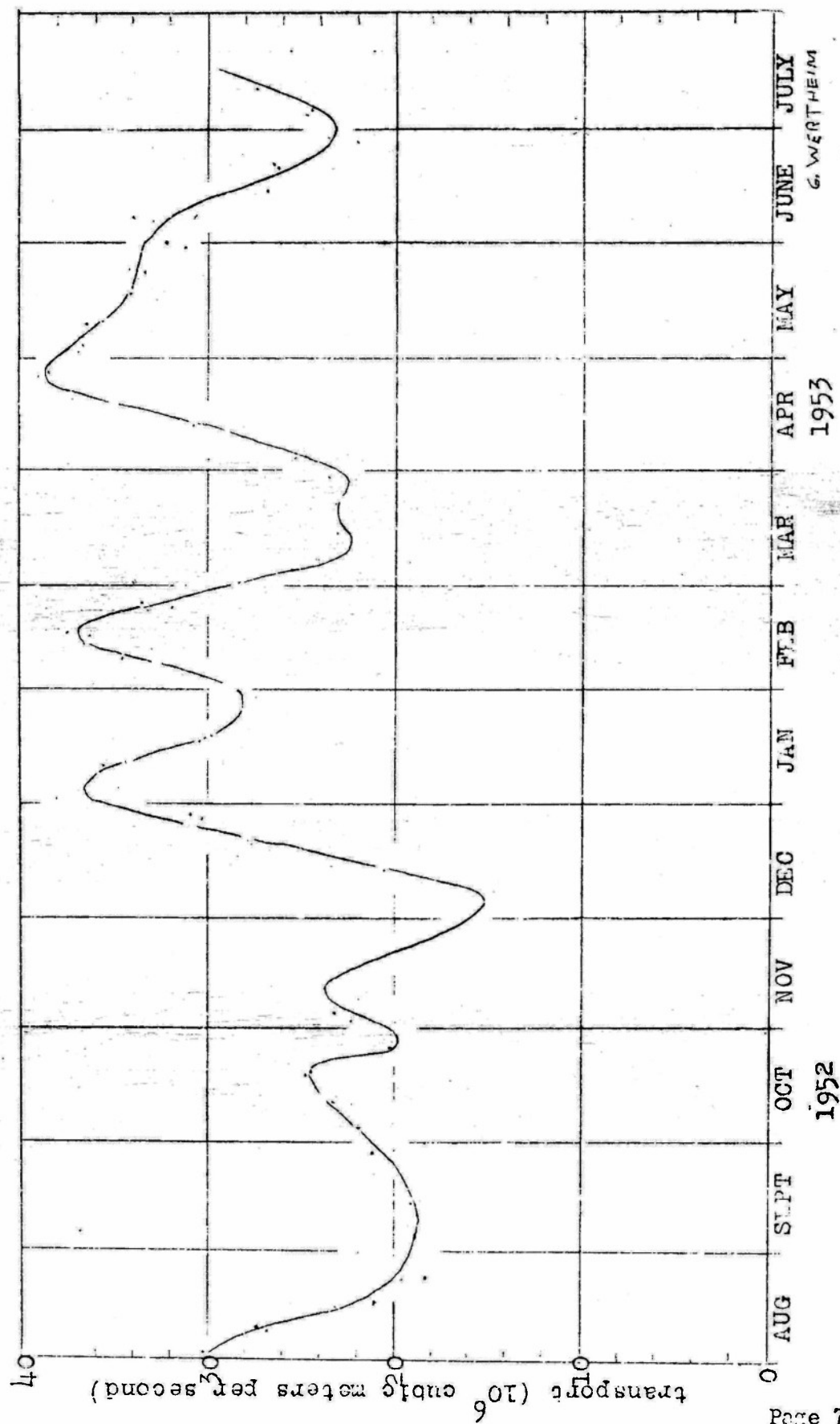


Fig. A-3 MASS TRANSPORT OF THE FLORIDA CURRENT

U.S. GOVERNMENT PRINTING OFFICE: 1953

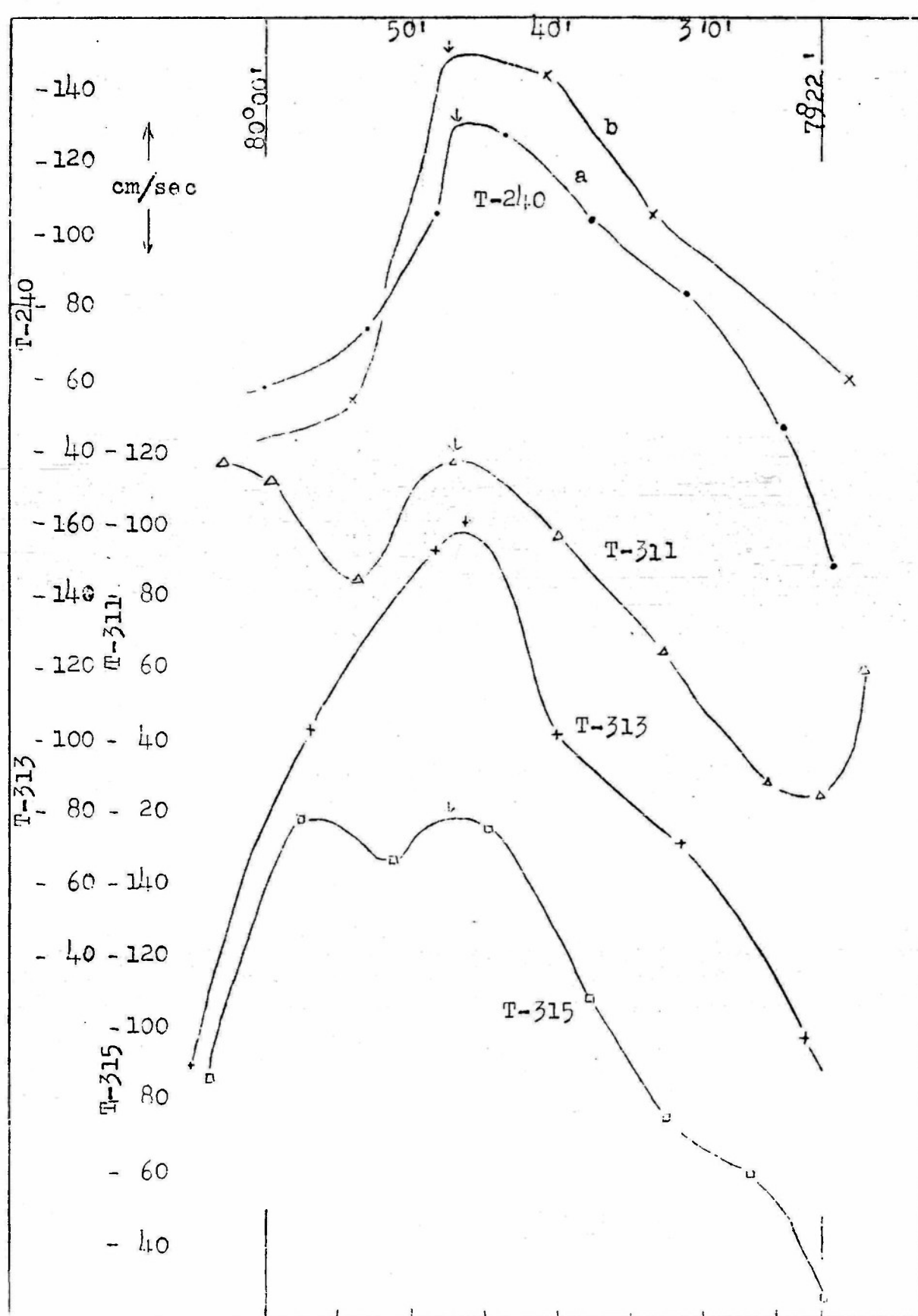


Figure A-4a NORM COMPONENTS OF CURRENTS
(uncorrected for "K" factor)

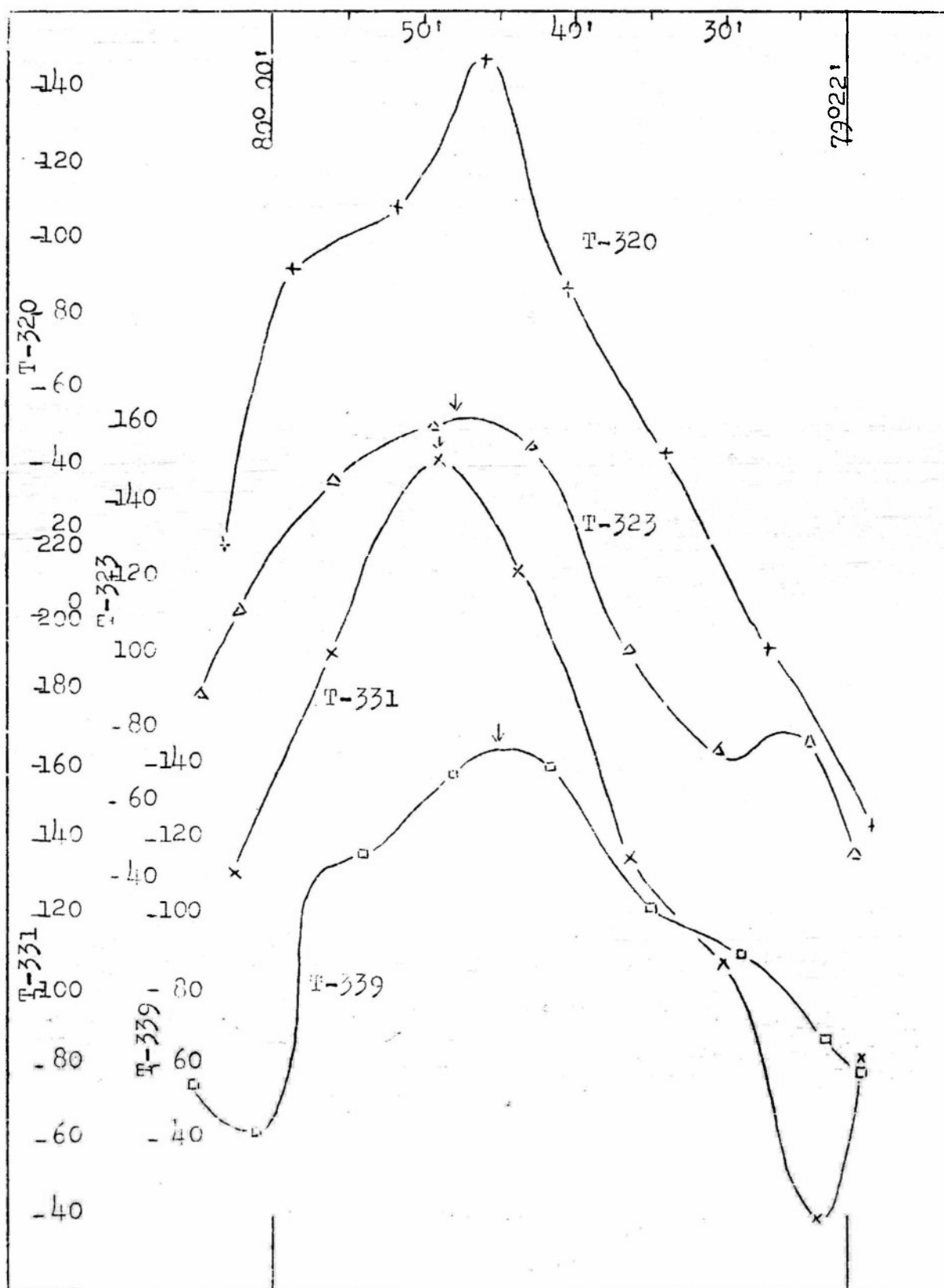


Figure 1-10 HOWN COMPONENTS OF CURRENT
(uncorrected for "K" factor)

TABLE A-1

Summary of GEK Transects

Cruises	Dates	Signs of transport change	Anticyclonic shears	Mean K	Mean ¹ K
T-240A	22 XII 52	positive	$5.2 \times 10^{-5} \text{ sec}^{-1}$	1.8	2.2
T-240B	23 XII 52	"	3.8	1.8	2.2
T-311B	17 II 53	negative	4.2	1.9	2.2
T-313B	27 II 53	negative	6.1	1.6	1.5
T-315A	12 III 53	negative or zero	5.0	1.5	1.6
T-320B	26 III 53	" " "	8.0	1.7	1.8
T-323A	28 IV 53	negative	4.5	1.7	1.4
T-331A	26 V 53	"	7.2	1.5	1.3
T-339A	25 VI 53	"	2.7	1.5	2.0

¹K values according to reference (5)

the K factor averaged over the whole current (the K factor is a number which the uncorrected GEK current should be multiplied to get the actual current). The K factors used were those given by Wagner and Chew (5) but adjusted to meet Wertheim's transport values.

The location of each GEK fix and the north component of each uncorrected GEK measured current for each of the above cruises are summarized in GEK Data Tables at end of report.

These data are plotted in Figure A-4, north component of the current against the meridians of the positions across the Florida Current. The circled dots and crosses are current fixes while the small vertical arrows indicate positions of shear in speed or relative maximum as determined from the original GEK records.

For the application of equations (2) and (3) the axis of the Florida Current needs to be defined. Bi-axial current is occasionally found, but for the purpose at hand, the current axis is defined as the absolute maximum in the north component found nearest to Long. 79 degrees and 47 minutes west;

as defined the current axis is seen to be contained within a zone of 10 kilometers. This is consistent with an earlier definition by Wagner and Chew (Op. Cit). To the east of the current axis as defined equation (3) will be applied while to the west of the axis equation (2) will be applied.

In the actual evaluation of V_e and V_w , the average surface speed east and west of the axis respectively, only the velocity curves included between Long. 80.00° and $79^\circ 22'$ west were used. The choice of these limits was more or less arbitrary but it was guided by the considerations that some GEK observations began or were discontinued at or near these longitudes and that west of Long 80.00° the bottom begins to shoal. The following operations were performed by planimetry:

$$v_e = \frac{1}{L_1} \int_A^C v dx \quad (4)$$

$$v_w = \frac{1}{L_2} \int_M^A v dx \quad (5)$$

Where v is the north component of the current, dx an increment of distance across the Florida Current, C the Long. $79^\circ 22'$, A the current axis, M the Long. $80^\circ 00'$; L_1 the distance $C-A$ and L_2 the distance $A-M$. These results are tabulated in Table 2. In all these instances V_e and V_w have the correct relative magnitude as illustrated in Figure A-I.

TABLE 2

Values of V_e and V_w

Cruises	V_w (cm/sec)	V_e (cm/sec)
T-240A	82	92
T-240B	74	115
T-311B	102	75
T-313B	124.7-	85
T-315A	152	97
T-320B	117	52
T-323A	151	106
T-331A	205	140
T-339A	97	87

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surfaces also exist. The current velocity profile adjusts itself in the manner that when the transport of the Florida Current is increasing with time the average current speed east of the current axis is higher than that west of the axis, and that when the transport is decreasing the current west of the axis is higher than that east of the axis.

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3. Wertheim, G. K., Studies of the Electric Potential Between Key West, Florida and Havana, Cuba. Trans. A. G. U. in press.
4. Von Arx, W. S., An Electromagnetic Method for measuring the Velocities of Ocean Currents from a Ship Under Way, Woods Hole Ocean. Inst., Vol. XI #3.
5. Marine Laboratory, University of Miami, Tech. Rept. 53-9.

SECTION B

NOTE ON THE TIDAL FLUCTUATIONS IN THE FLORIDA CURRENT

by

Ilmo Hela and Lansing P. Wagner

For a period of twelve months from December 1952 to November 1953 about 280 Geomagnetic Electrokinetograph "fix stations" were occupied between the Miami Sea Buoy and Gun Cay on the western edge of the Great Bahama Banks. The relatively great number of these stations, which gave information on the distribution and fluctuations in the current, allows for a tentative study on the possible tidal fluctuations in the current. To start with, the west-easterly average distribution of the north and of the east component of the current as indicated by the GEK is given in Figure B-1. The same components were used to draw Figure B-2 which shows the east-westerly average distribution of the current vectors. For these representations the area of observation was divided into sections with 15 to 20 current measurements in each. From these figures the mean location of the axis of the Florida Current can be seen to be roughly at $79^{\circ}47'W$ IN THIS AREA. In addition to this the diverging character of the mean current profile is recognizable.

An attempt has been made to study the tidal fluctuations in the Florida Current. For this purpose 187 GEK current measurements were plotted against lunar time. The annual fluctuation in the current, the random meteorological changes in the current conditions, the velocity gradient from west to east and the variations in the magnetic field of the earth would make it necessary to have a great number of observations available for a complete study of the tidal fluctuations. Though the number of stations now available is not great enough, the data seem to indicate the existence of a tidal fluctuation. The

mean speed of the Florida Current, indicated by the GEK, varies according to the measurements now available in the manner shown in Table B-1 and Figure B-3.

Table B-1 THE MEAN SPEED OF THE FLORIDA CURRENT AS INDICATED BY THE GEK AS A FUNCTION OF THE LUNAR TIME

Time	Northerly component cm/sec	Easterly component cm/sec	Speed cm/sec	Direction
High Tide at Miami Beach	70	7	70	006°
+1 lunar hour	62	6	62	006°
+2	52	7.5	53	008°
+3	67	17	69	015°
+4	105	1	105	000°
+5	101	8	101	005°
+6	79	1.5	79	001°
+7	97	6	97	004°
+8	57	0	57	000°
+9	70	2	70	002°
+10	79	9	80	007°
+11	79	8.5	79	006°

The harmonic analysis for the lunar cycle of the northerly component yields the following sine curve:

$$v_N = 76.5 + 12.5 \sin(x - 89^\circ)$$

Thus it seems probable that there is a maximum in the northerly component of mean speed of the Florida Current simultaneous with the low tide at Miami Beach and a minimum northerly speed simultaneous with the high tide at Miami Beach.

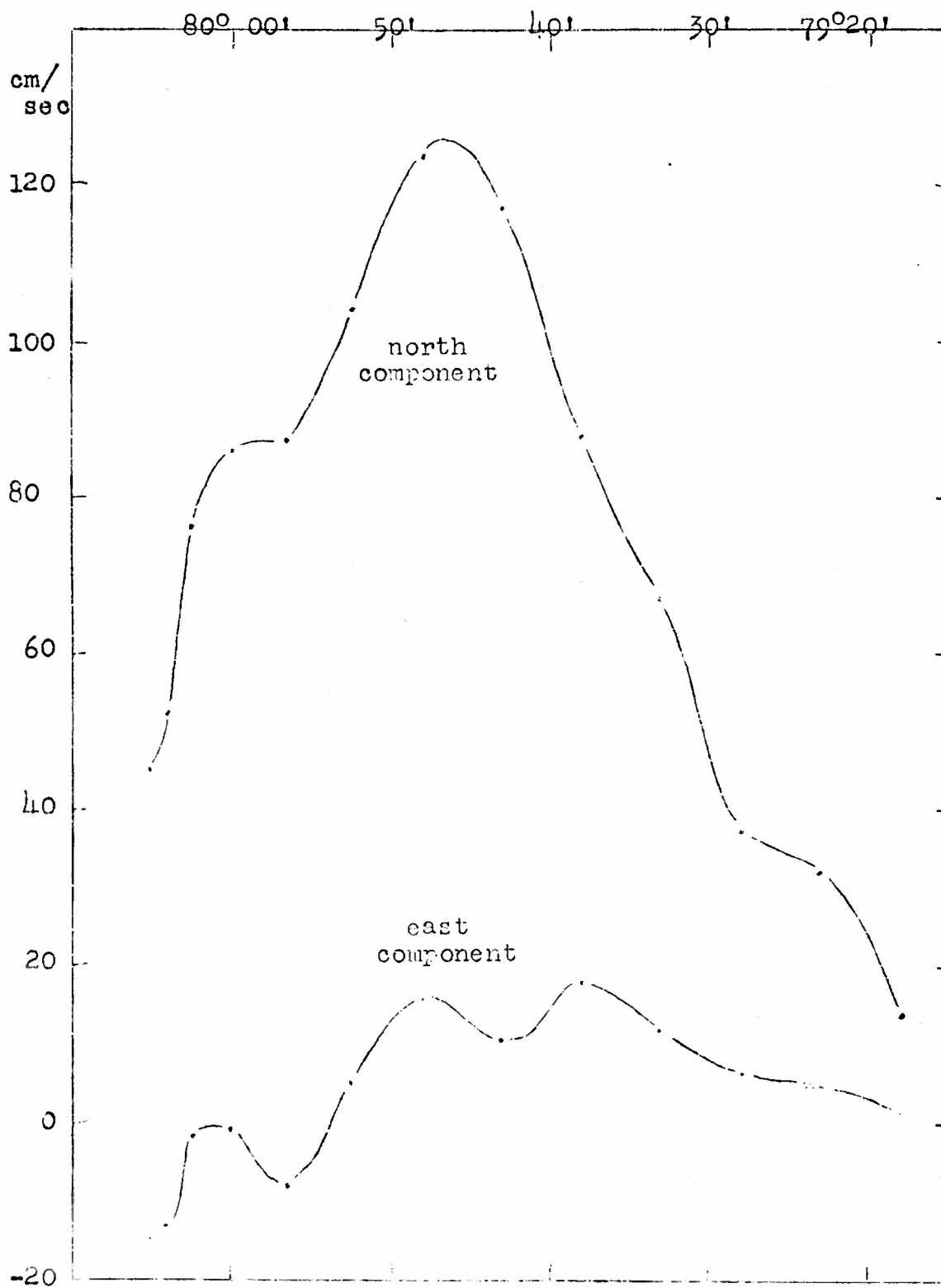


Figure B-1 AVERAGED NORTH AND EAST CURRENT COMPONENTS

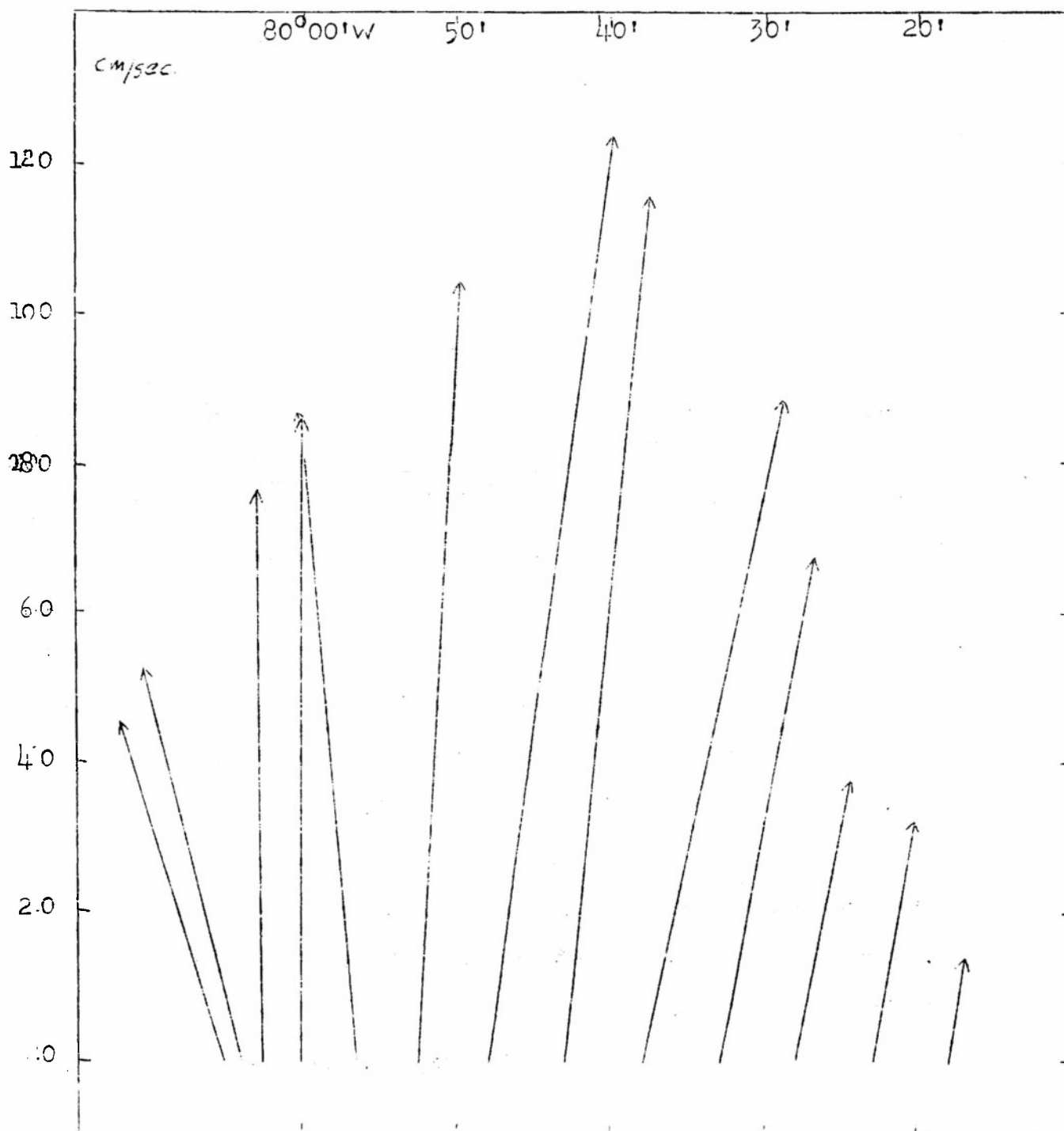


Figure B-2 AVERAGED G.E.K. CURRENT VECTORS

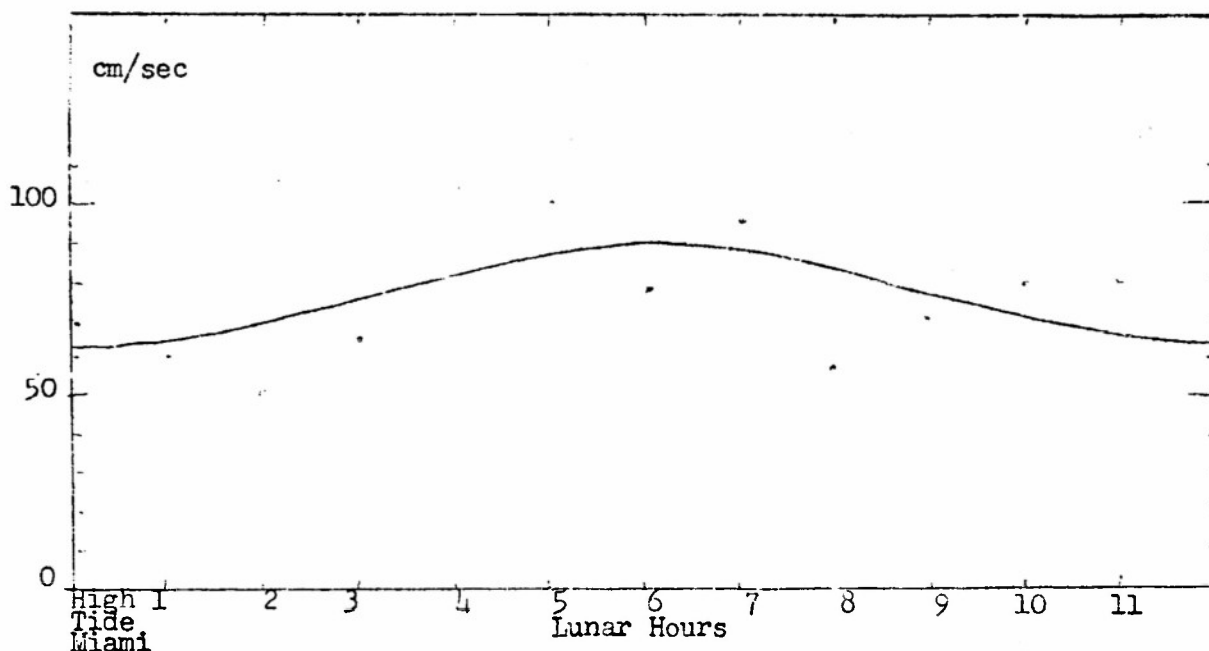


Figure B-3. THE MEAN SPEED OF THE FLORIDA CURRENT AS INDICATED BY THE GEK AS A FUNCTION OF THE LUNAR TIME

In connection with the study of the tidal fluctuations a tentative attempt was made to determine the existence of possible internal waves in the Straits of Florida. For this purpose during Cruise T-362, 10-11 November 1953, six hydrographic stations were occupied in the locality of $25^{\circ}40'N$ $79^{\circ}57'W$, where the depth is 180 fathoms. Stations were occupied every two hours. The GEK indicated a surface current of about 30 cm/sec (uncorrected for "K"). The depths of the different isothermal, isohaline and isopycnic surfaces were plotted as a function of time. A distinct up-and-down movement of these surfaces can be seen in the curves given in Figures B-4, 5 and 6. Finally, Figure B-7 shows a combined T-S curve which indicates no changes in the water mass.

Therefore, an hypothesis is needed to explain the observed phenomena. We have to assume that the observations are accurate and that the vertical displacements according to the temperature, salinity and density data are roughly the same. Figure B-8 shows the corresponding "wave heights" as a function of the depth. The maximum of the vertical displacement is encountered at the depth of about 250 meters. At that depth no changes in the hori-

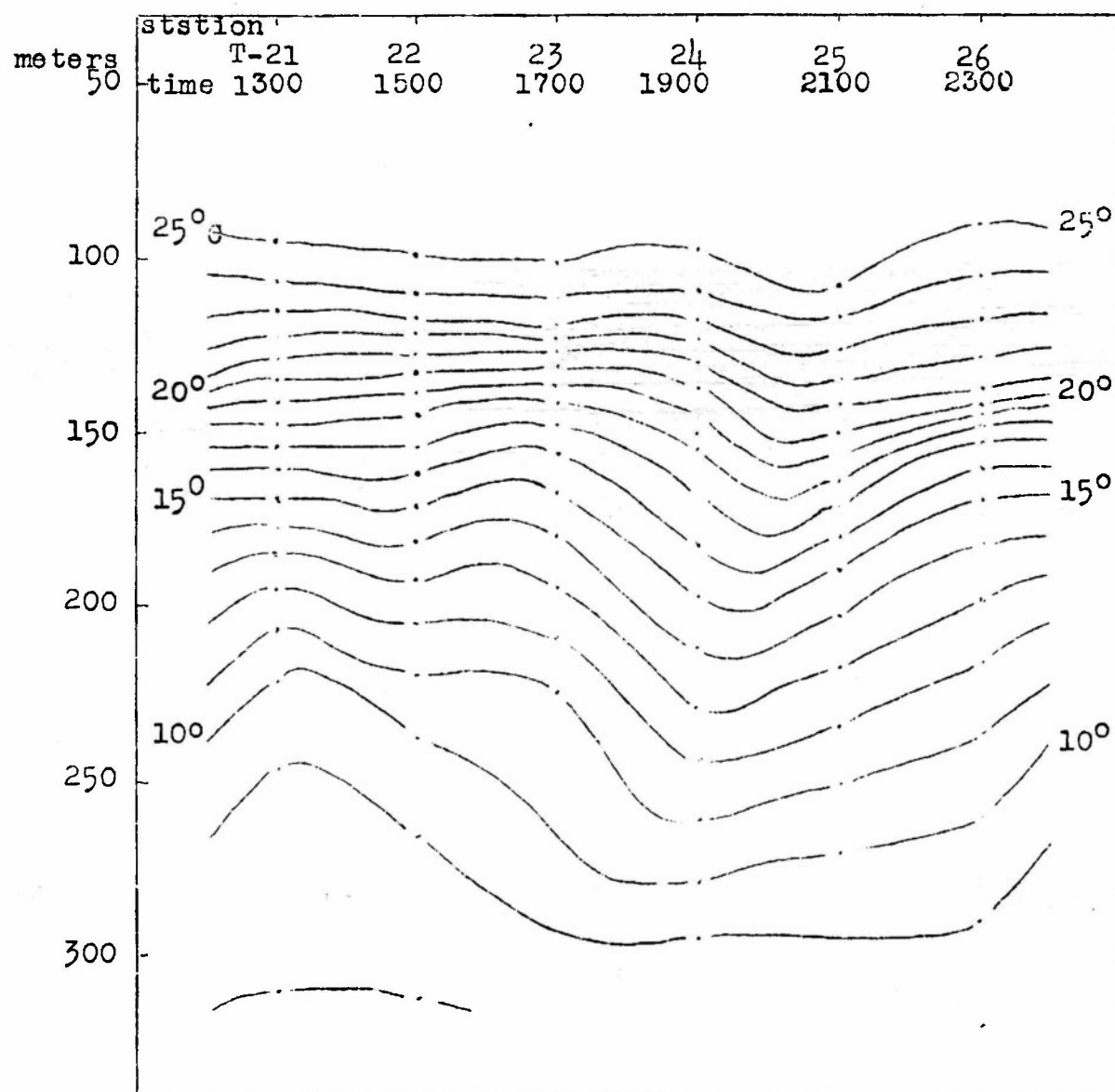


Figure B-4 TEMPERATURES
CRUISE T-362

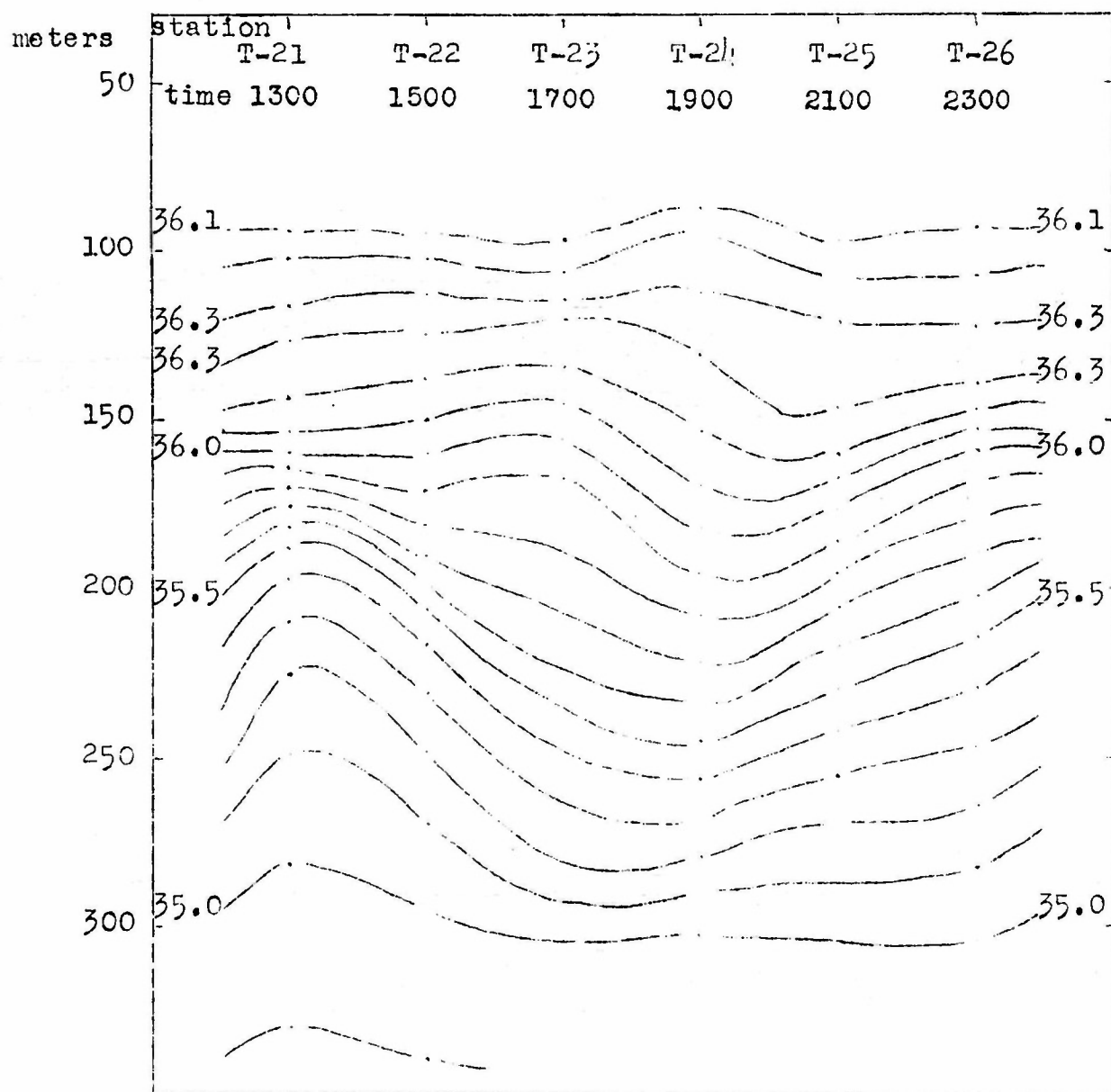


Figure B-5 SALINITIES
CRUISE T-362

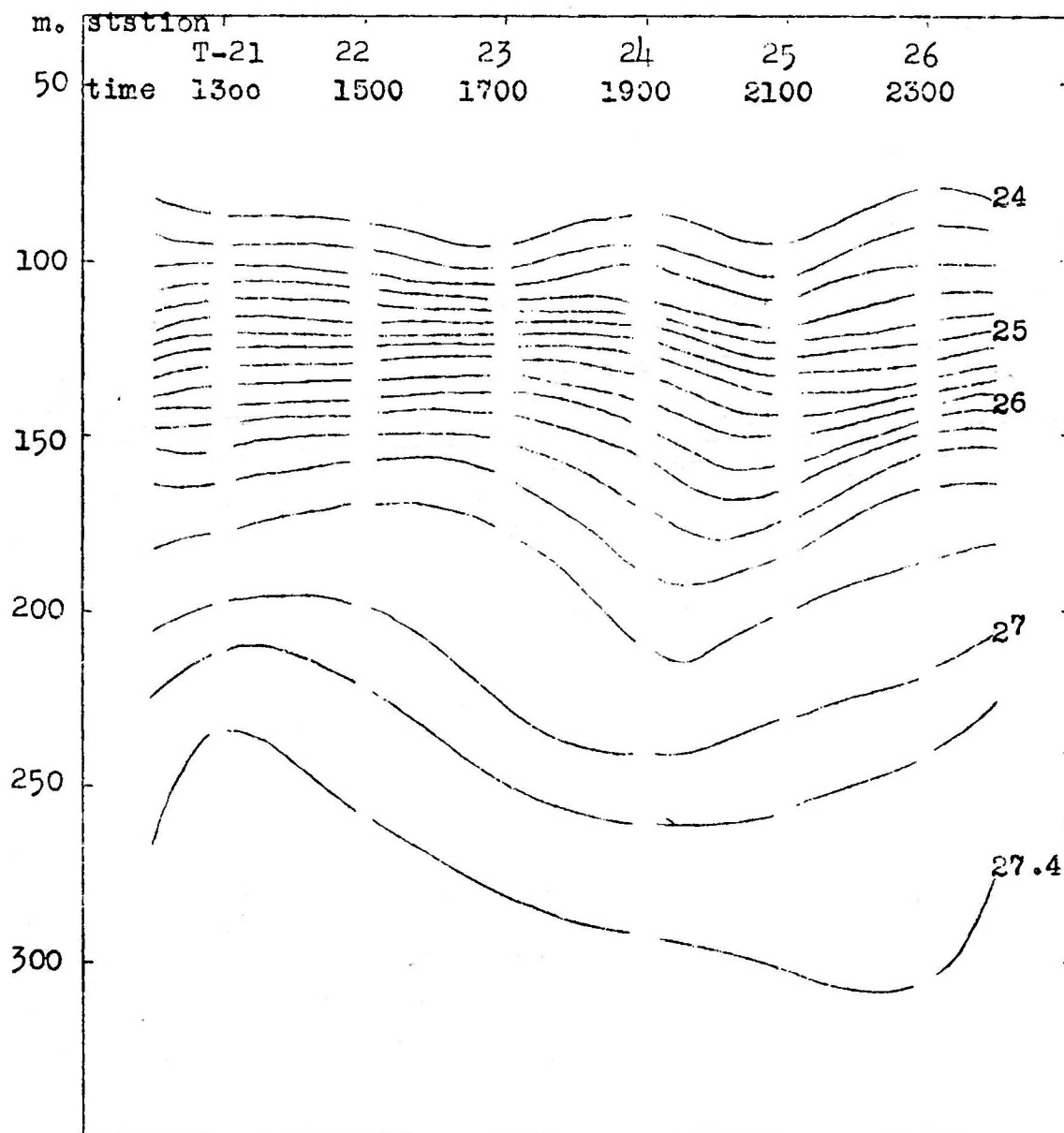


Figure B-6 Sigma T VALUES
CRUISE T-362

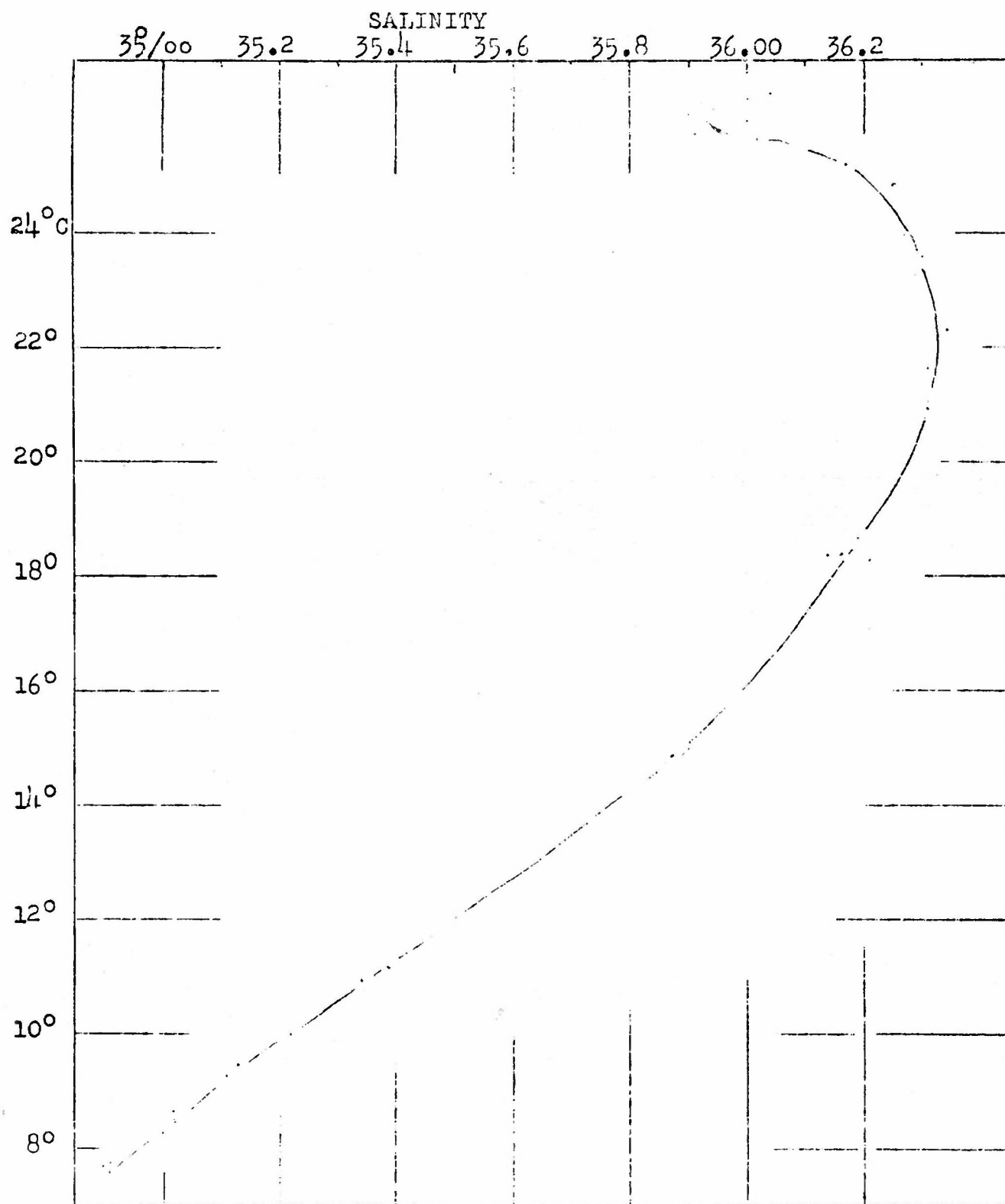


Figure B-7 TEMPERATURE-SALINITY CORRELATION
CRUISE T-362

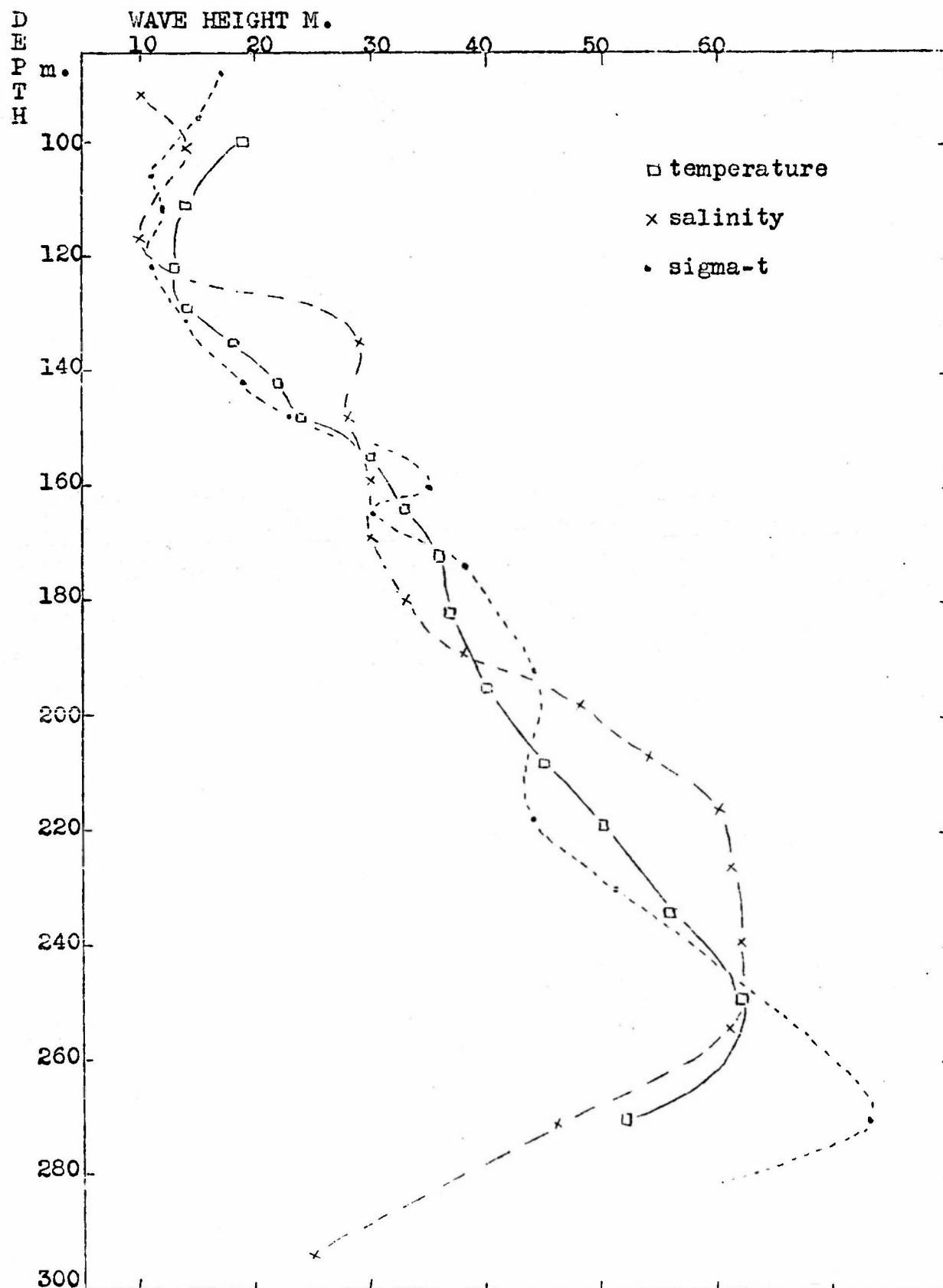


Fig. B-8 WAVE HEIGHTS AS A FUNCTION OF DEPTH

zontal velocity can be expected in connection with these displacements. The changes in the horizontal velocities connected with these vertical displacements will have a maximum close to the sea surface. (Below 250m. the horizontal changes in the velocity must be opposite to the ones above the limiting layer.) The most probable cause for this internal fluctuation is that of a wave coming from the south. During this short period of observation the internal wave seems to have its uppermost position at 10:00 hours. Also at 10:00 hours at the surface a maximum southerly component of the current is to be found. In fact, the maximum flood at Miami Beach occurs at about 08:40 hours corresponding to the minimum northerly flow at the surface.

SECTION C

GRAPHIC REPRESENTATIONS OF TRANSECTS OF THE FLORIDA CURRENT AND COMMENTS

ABSTRACT

(1) A temperature-depth profile; (2) a curve showing surface currents across the Florida Current as recorded by the GEK; and (3) curves showing temperatures at 100 meters and 200 meters have been plotted for each transect. In the temperature-depth profiles there is a dotted line to show the depth of the isothermal water. The depth of each reading has been corrected whenever the bathythermogram showed a false surface pressure reading. For those transects made with the CEK bathythermograph traces have been included. All BT slides will be sent to the Woods Hole Oceanographic Institution where they will be photographed. One set will be sent to the Hydrographic Office. Data from several hydrographic stations are included in this section.

The Cay Sal Bank region, in the Straits of Florida immediately north of Cuba, is one of great interest to marine biologists and sports fishermen due to its abundance of fish and plankton. It is also an area of converging currents that may produce hydrographic phenomena seldom encountered in other areas. For these reasons a preliminary cruise was made in that region. "The Atlas of Surface Currents" (H.O. 571) was consulted in an attempt to estimate the current pattern in the channels around the Bank.

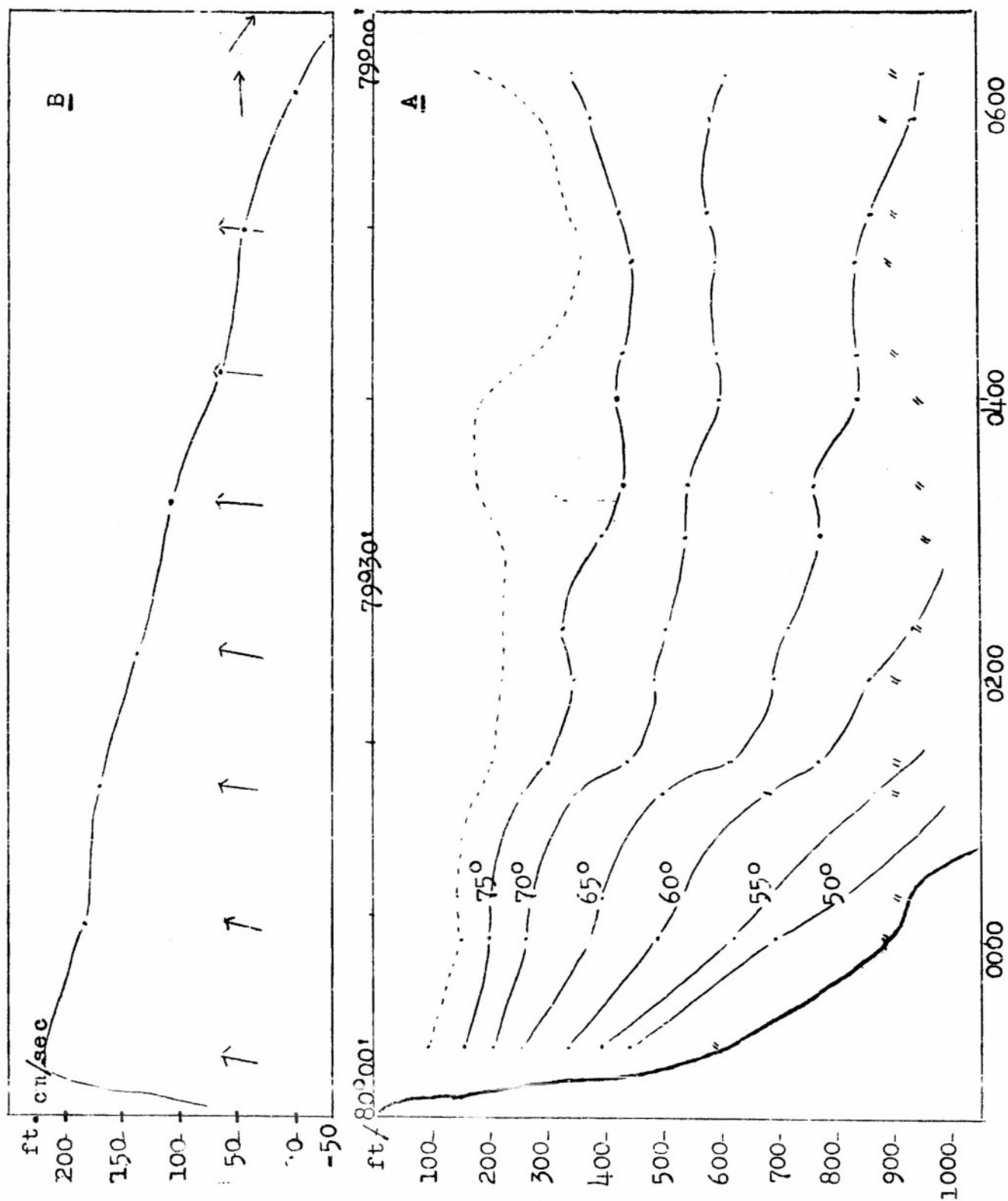


Fig. C-1 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
CRUISE T-324 Lake worth to Grand Bahama I. May 8, 1953

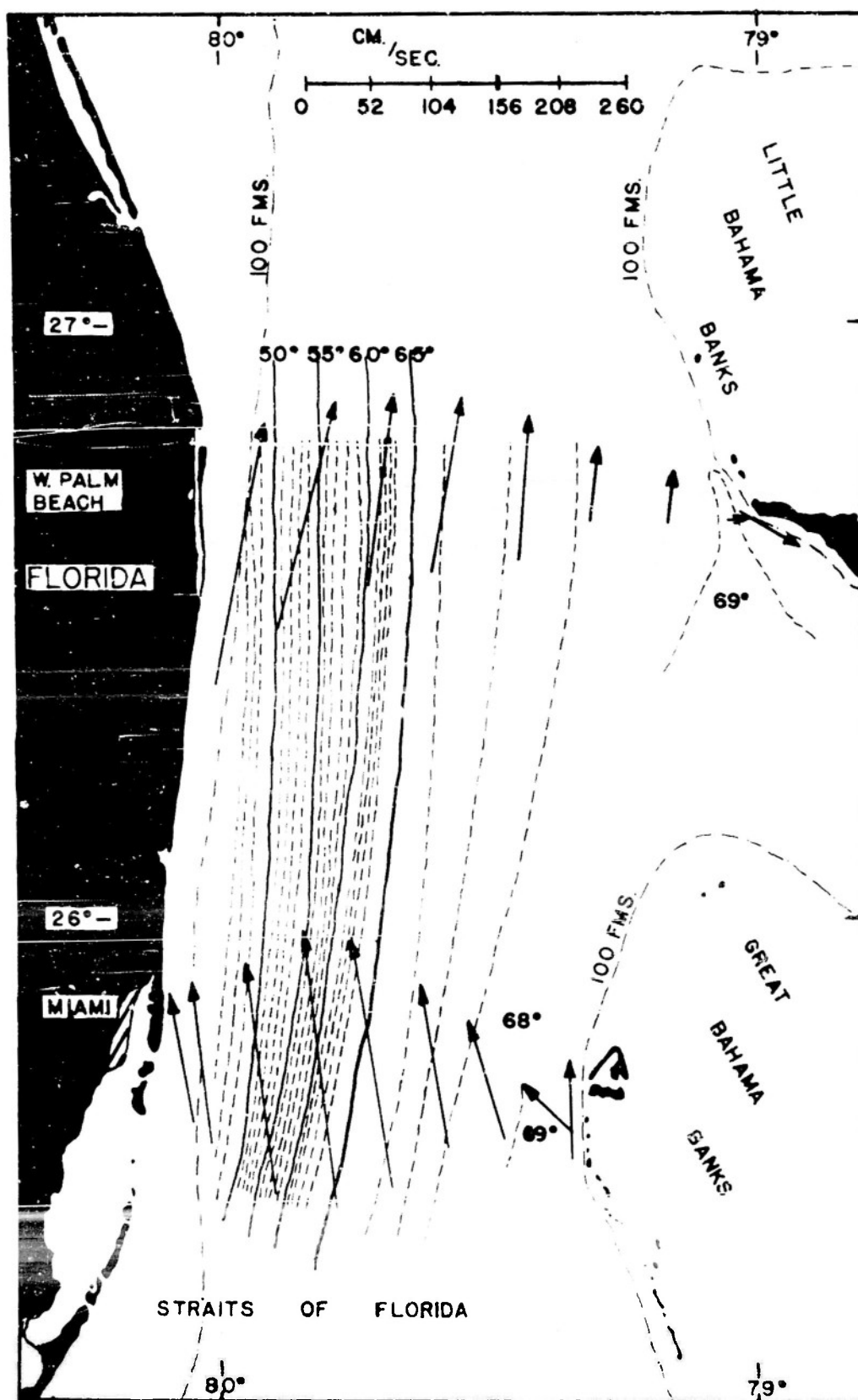


FIGURE C-4

GEK CURRENT VECTORS AND TEMPERATURE AT 200 METERS
FOR CRUISES T-324 AND 331.

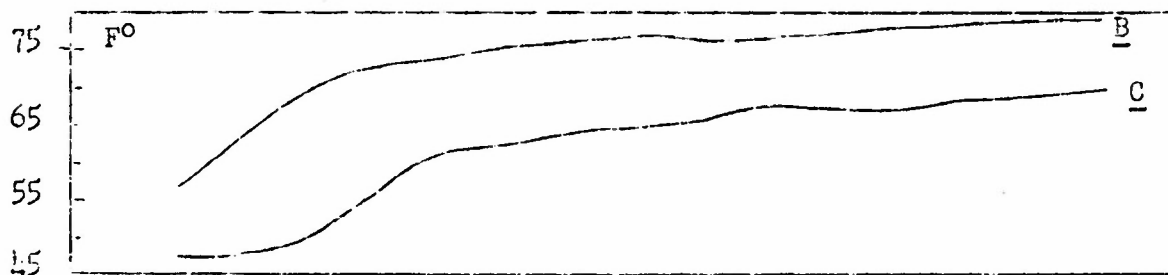
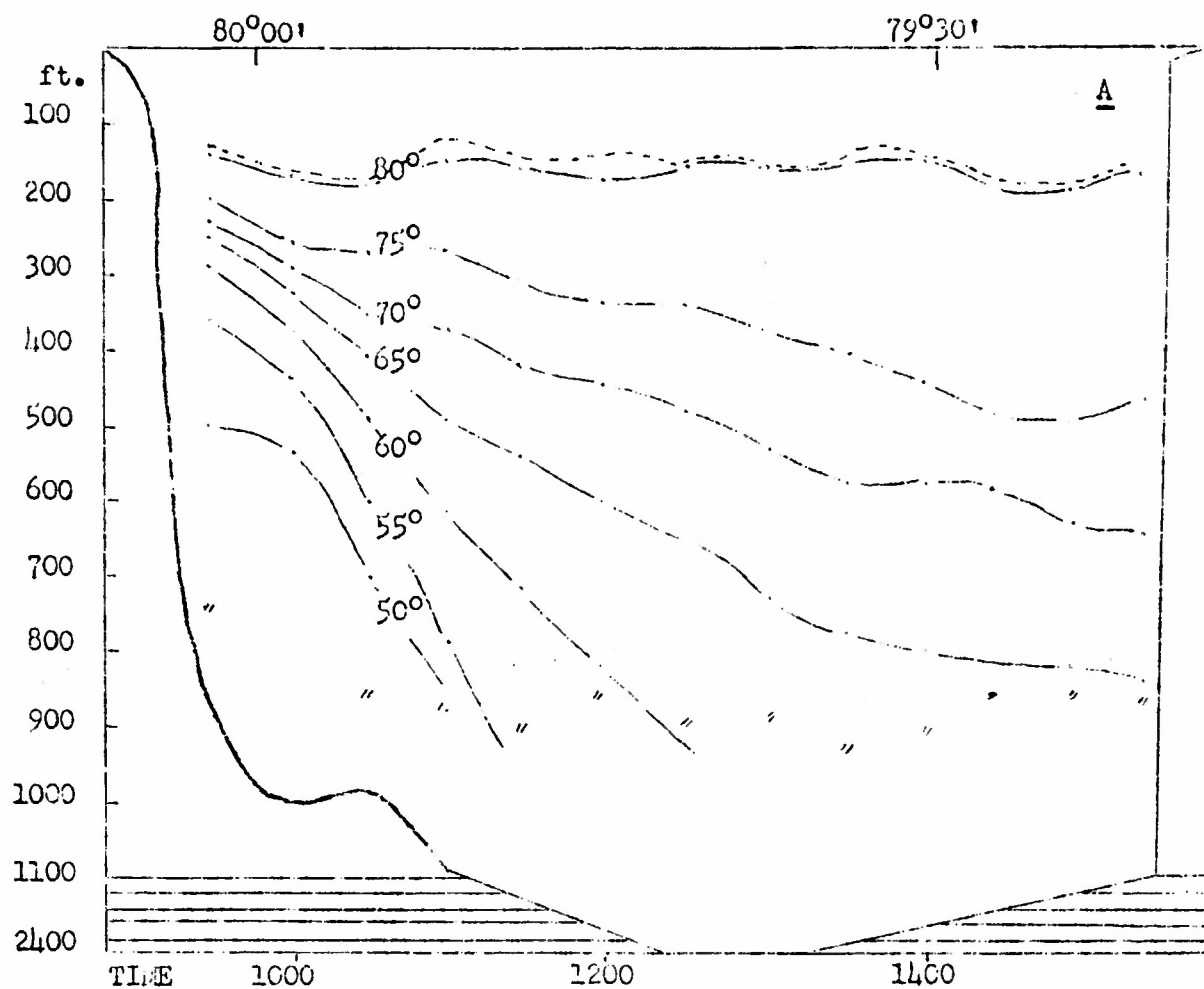


Fig. C-5 A TEMPERATURE-DEPTH PROFILE
 B&C TEMPERATURE AT 100 and 200 METERS
 CRUISE T-334a Miami -Cat Cay June 9, 1953

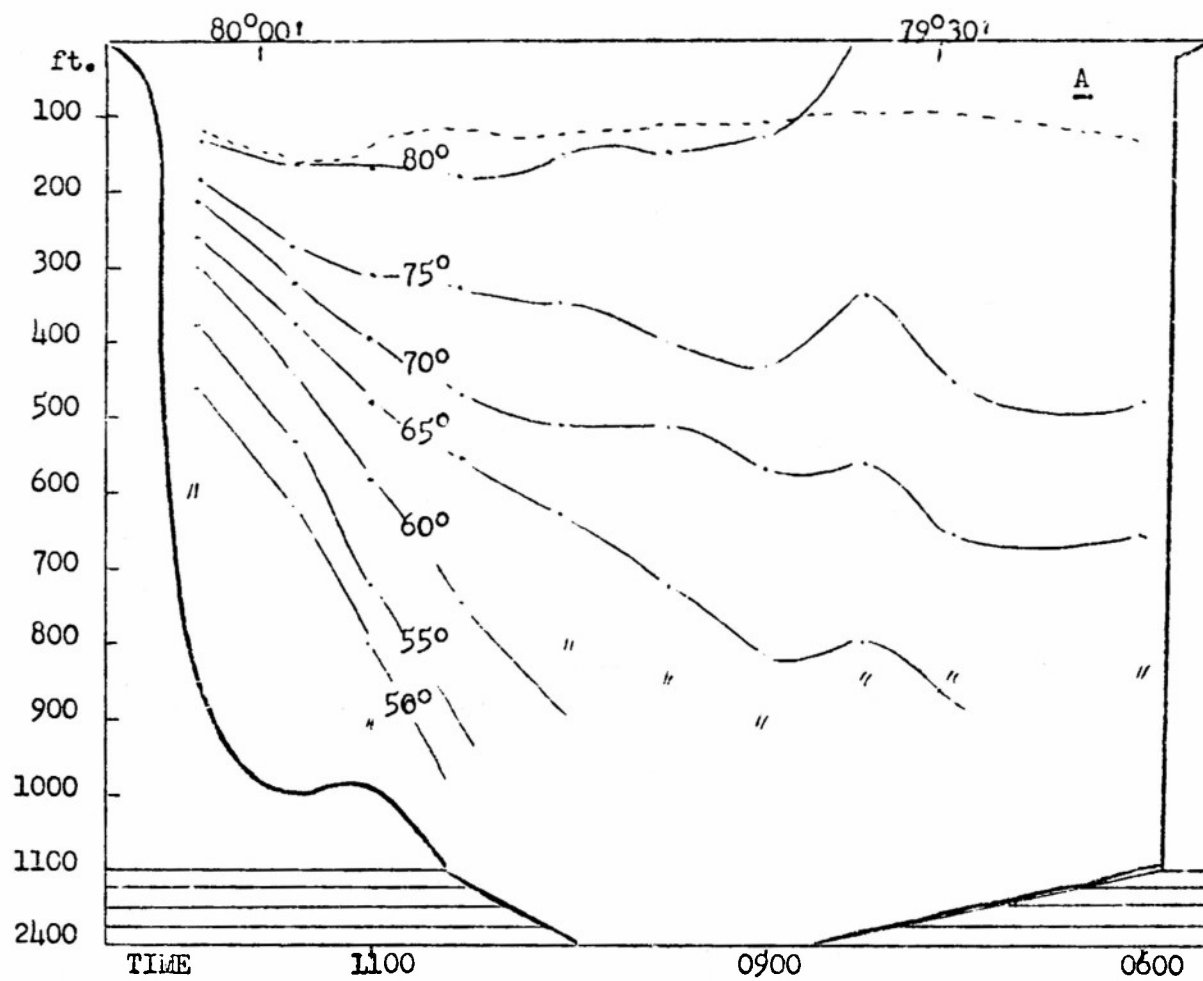


Fig. C-6 A TEMPERATURE-DEPTH PROFILE
 B&C TEMPERATURES AT 100 and 200 METERS
 CRUISE T-334b Cat Cay-Miami June 10, 1953

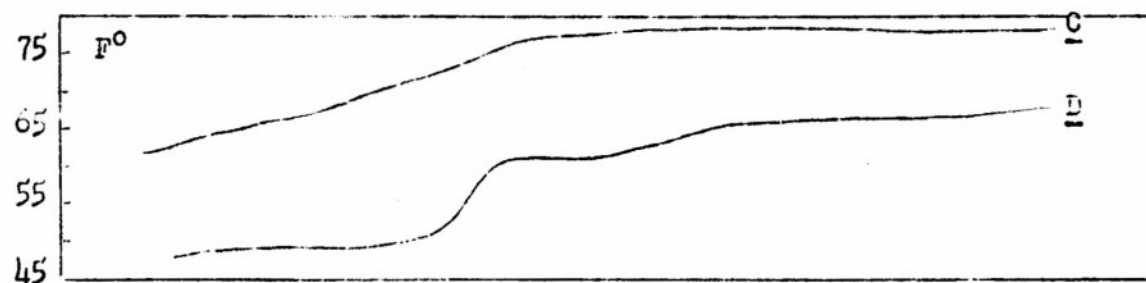
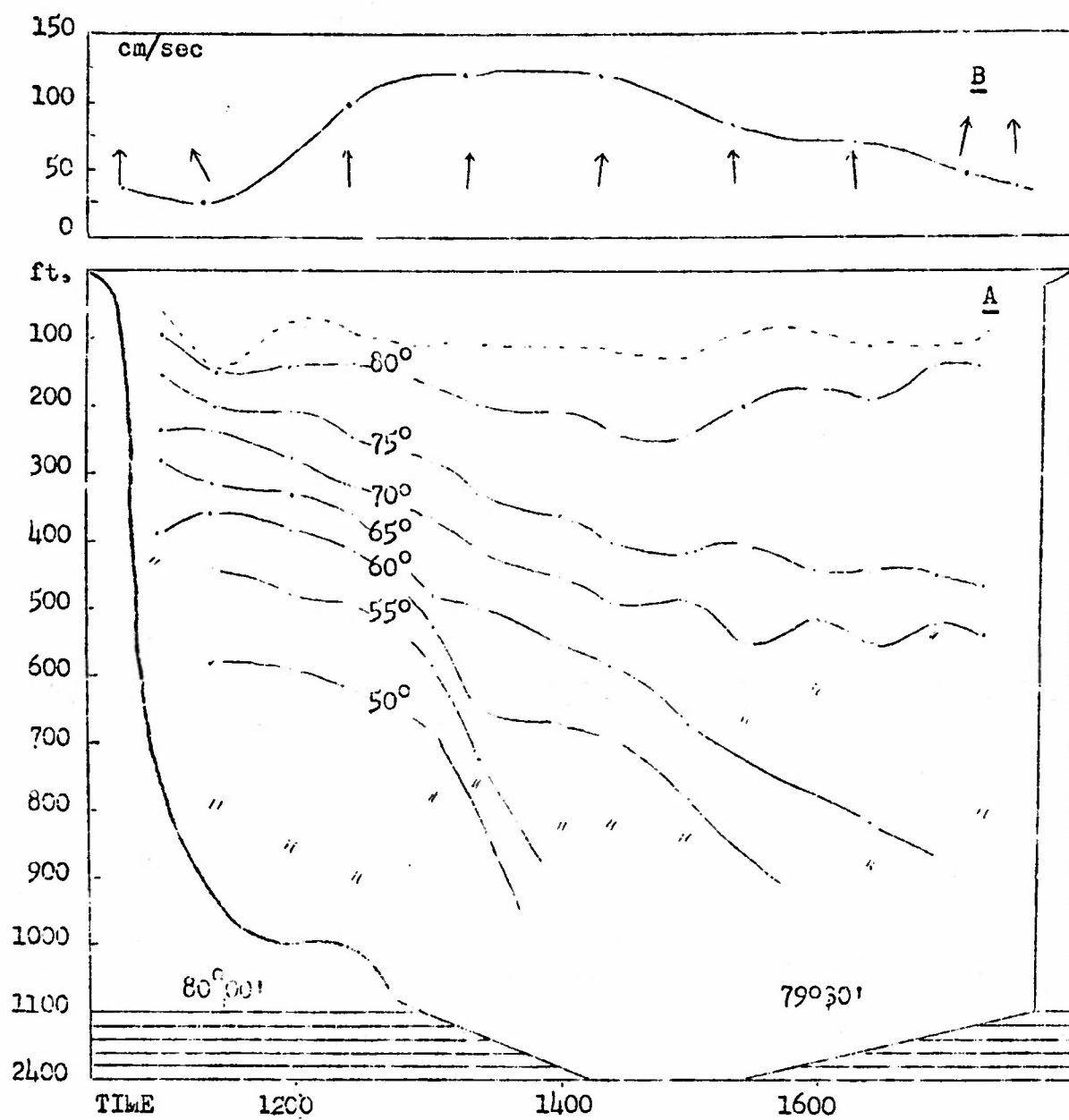


Fig: C-7 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
 CTD TEMPERATURES AT 100 and 200 METERS
 CRUISE T-339a Miami-Cat Cay June 25, 1953

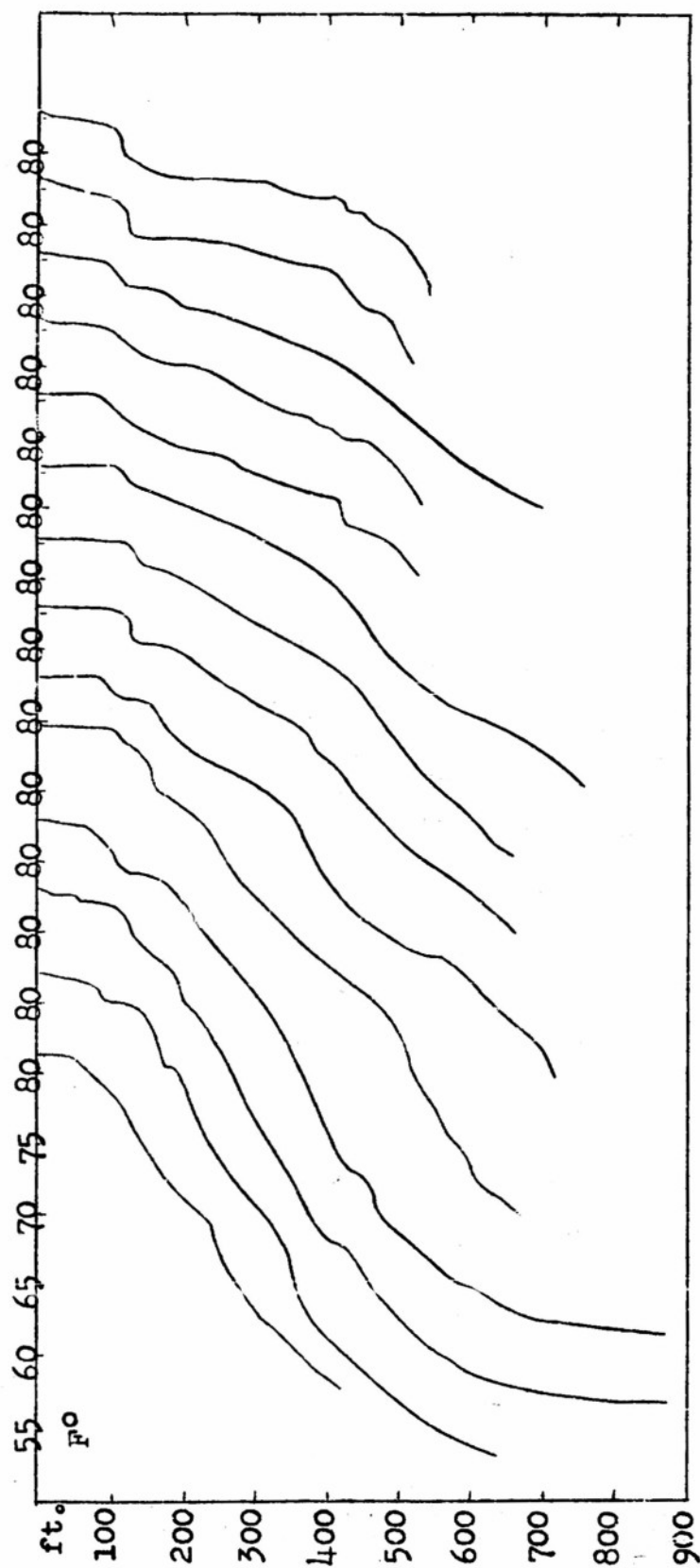


Figure C-8 BATHYTHERMOGRAPH TRACINGS 1cm = 5°F
CRUISE T-339a

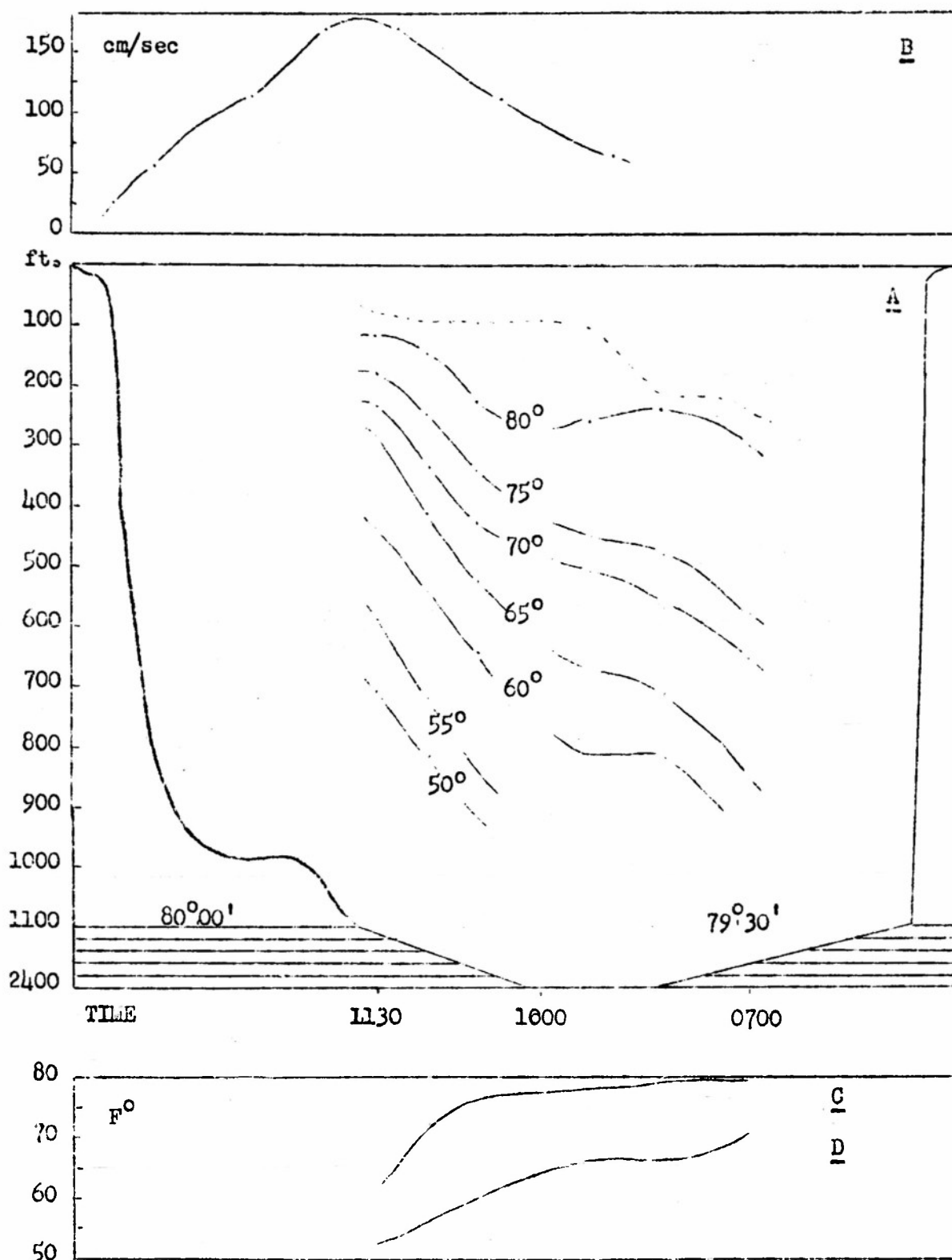


Fig. C-9 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 METERS
 CRUISE T-339b Cat Cay-Miami June 26, 1953

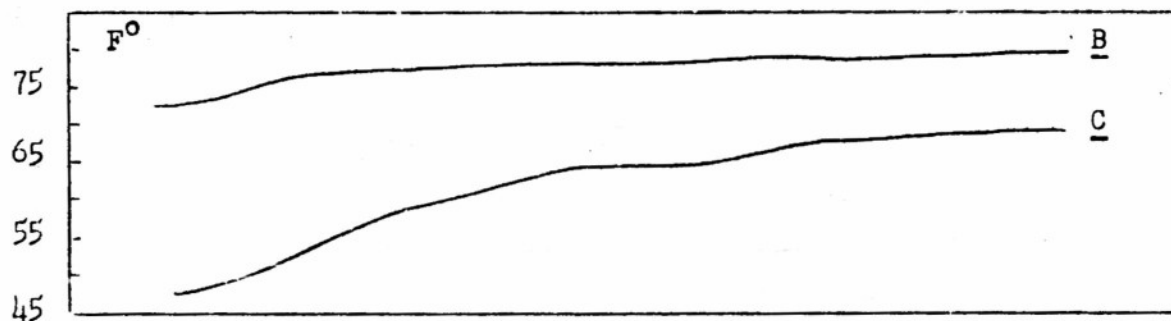
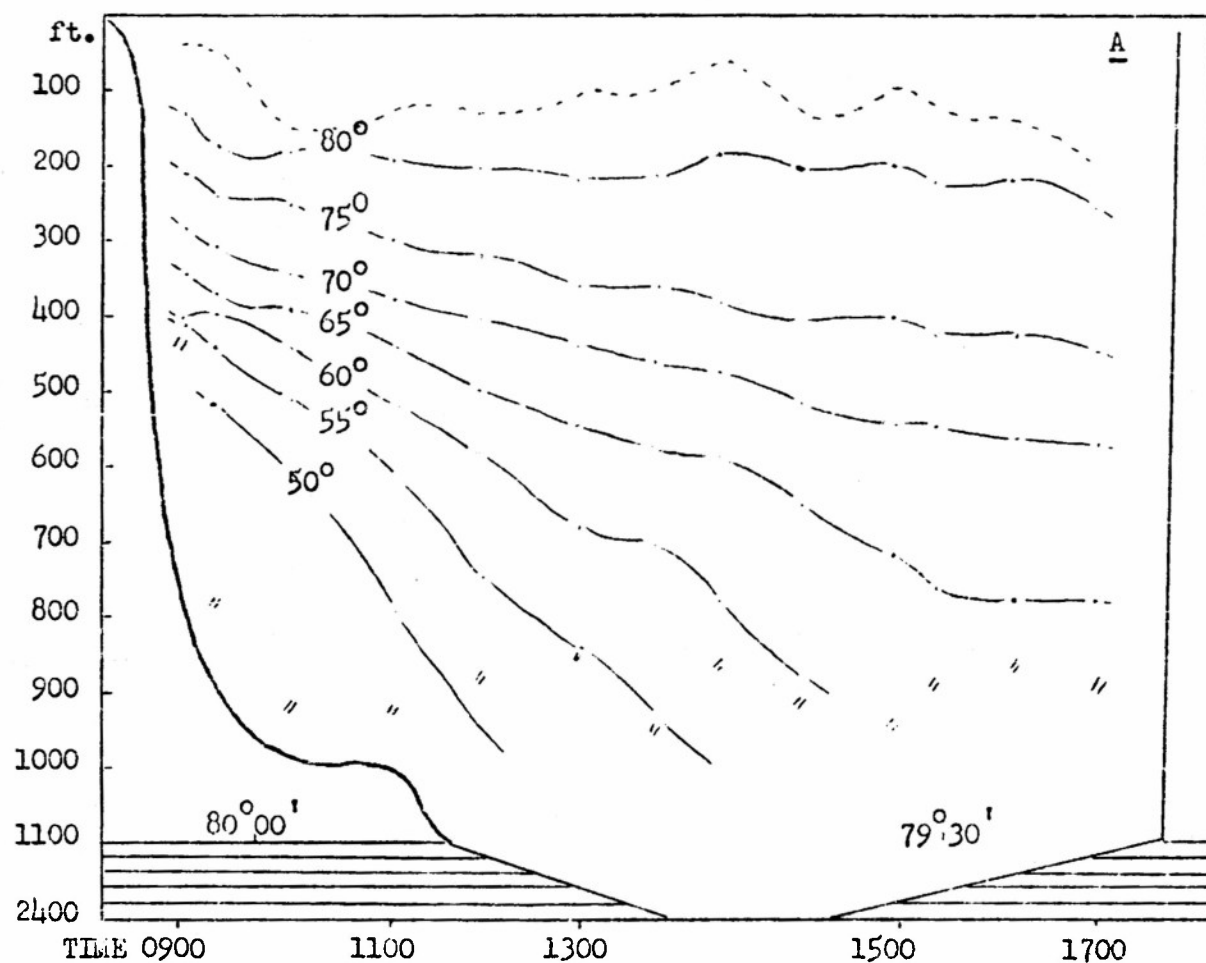


Fig.C-10 A TEMPERATURE-DEPTH PROFILE
 B&C TEMPERATURES AT 100 and 200 METERS
 CRUISE T-344a Miami-Cat Cay July 7, 1953

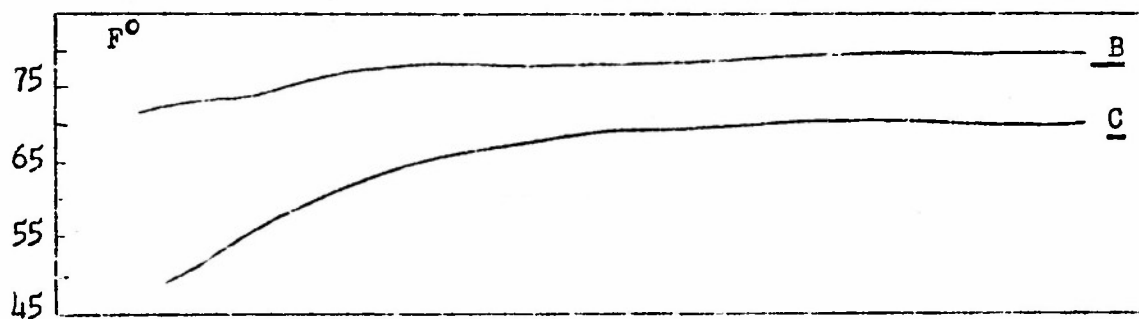
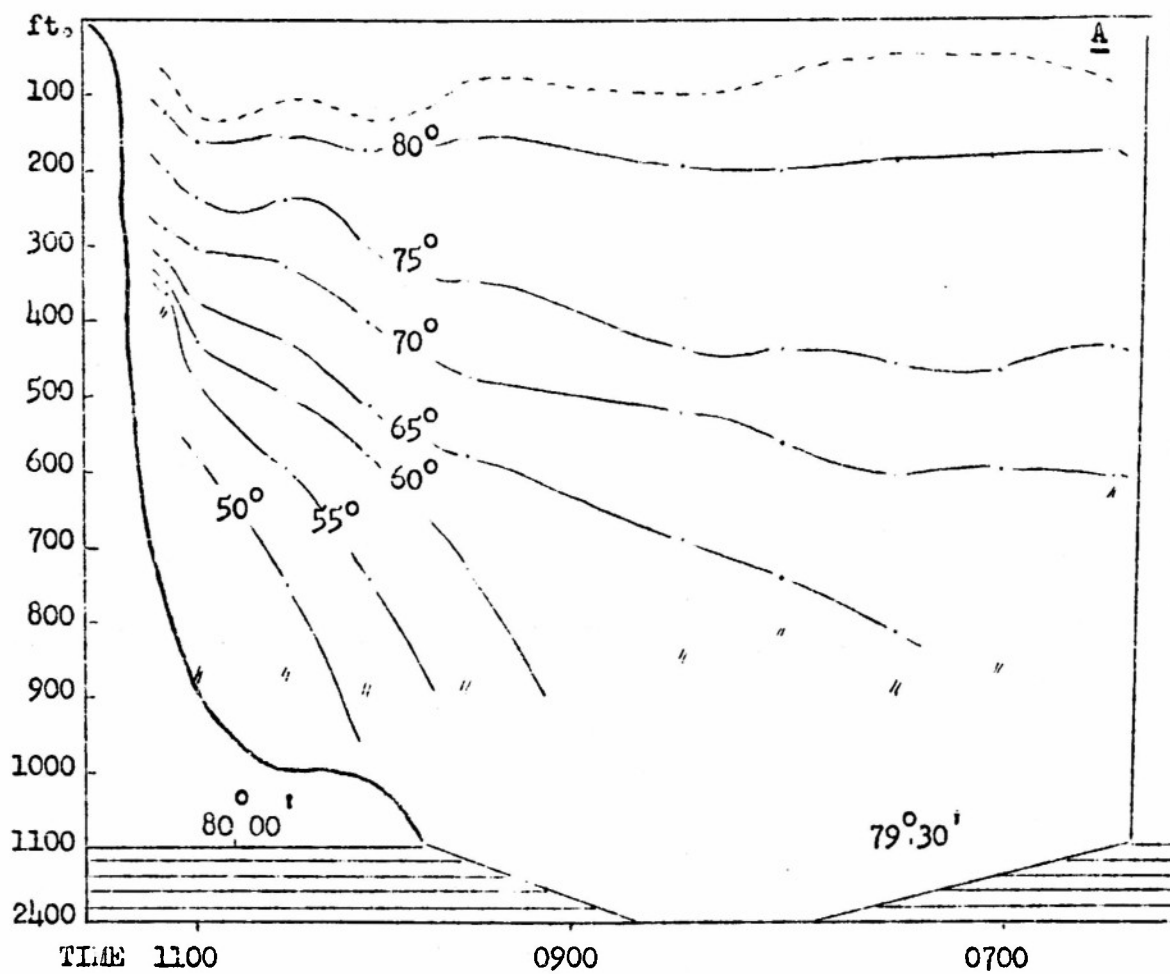


Fig. C-11 A TEMPERATURE-DEPTH PROFILE
 BEC TEMPERATURES AT 100 and 200 METERS
 CRUISE T-344b Cat Cay-miami July 8, 1953

Very generally the pattern is this: Northwest of Elbow Cay the current increases during the spring and decreases from July to December. Southwest of the Bank there are indications that as the Florida Current increases in velocity there is an increased easterly component of flow in the Nicholas Channel. As the velocity of the Florida Current drops off in the autumn and early winter, the direction of flow in the Nicholas Channel takes on a westerly component. Off the northeast region of Cay Sal Bank there are higher velocities from January through August, followed by a large decrease in September lasting through December. All of the current directions are generally north of northeast with an increased easterly component in spring and autumn. Southeast of the Anguilla Islands there is a weak, irregular flow to the northwest which increases in April and in August. The flow through the Old Bahama Channel is highest in the autumn and early winter, decreasing through July followed by an increase. In general the highest velocities occur there during the low velocity period of the Florida Current.

The surface current pattern indicated by the GEK during Cruise T-347, July 1953 (see Figure C-15) shows the extreme right edge of the Florida Current entering the western mouth of the Nicholas Channel and possibly meeting with a weak northwesterly current in the channel at about $80^{\circ}22'W$. The resultant direction of flow becomes northerly as the southwestern part of the Bank are approached. In the Santaren Channel a southerly current was indicated by the GEK and by the temperature pattern (See Figure C-13.) Further east toward the Great Bahama Banks the current swung northward cyclonically. At present it is impossible to explain where the southward flowing water came from. It may have come from around the northwest portion of Cay Sal Bank as indicated by the current directions on the previous leg, or it may have been a southern extension of a long countercurrent, which has occasionally been noticed west of Cat Cay.

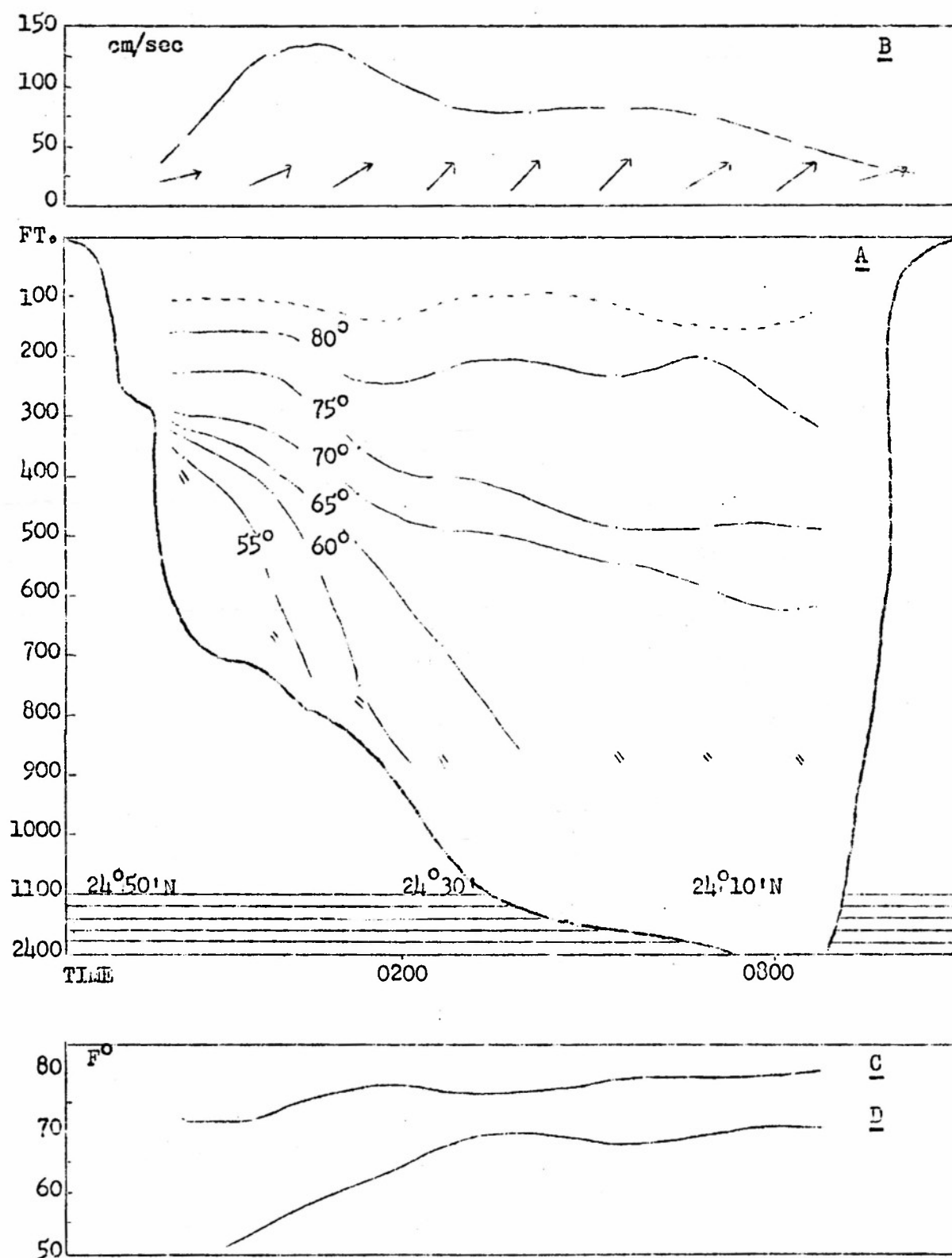


Fig.C-12 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 meters
 CRUISE T-347 Alligator Reef to Cay Sal Bank July 22, 1953

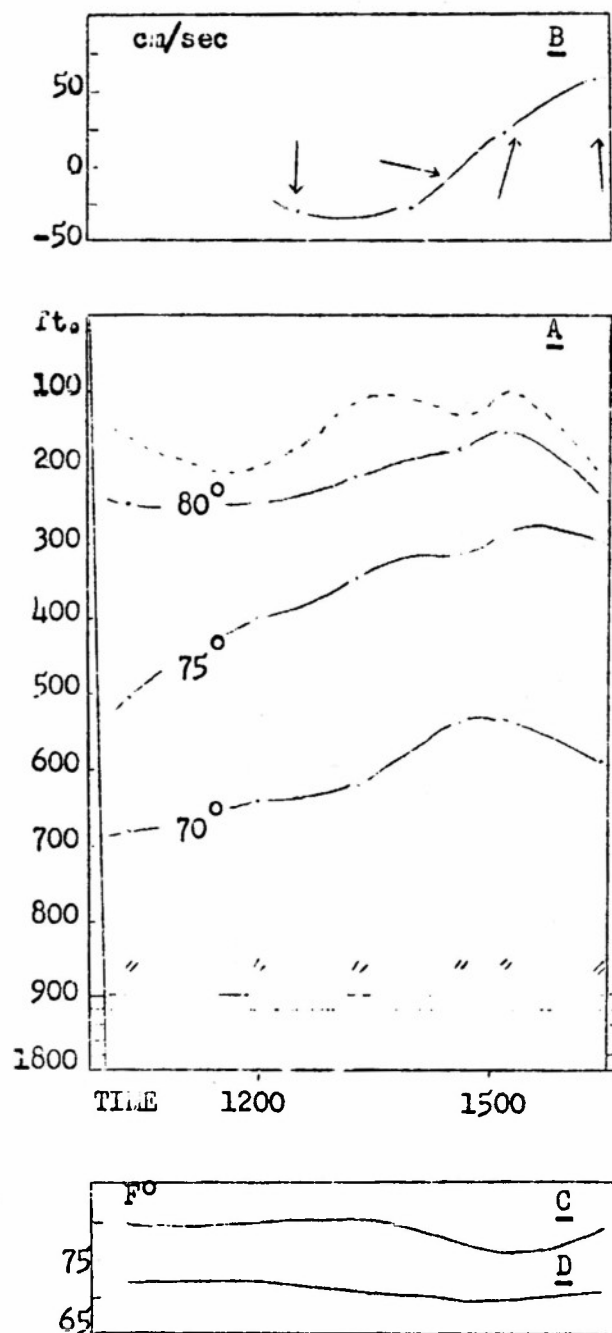


Fig. C-13 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 METERS
 CRUISE T-347 Anguilla I. to Bahama Banks across
 Santaren Channel July 22, 1953

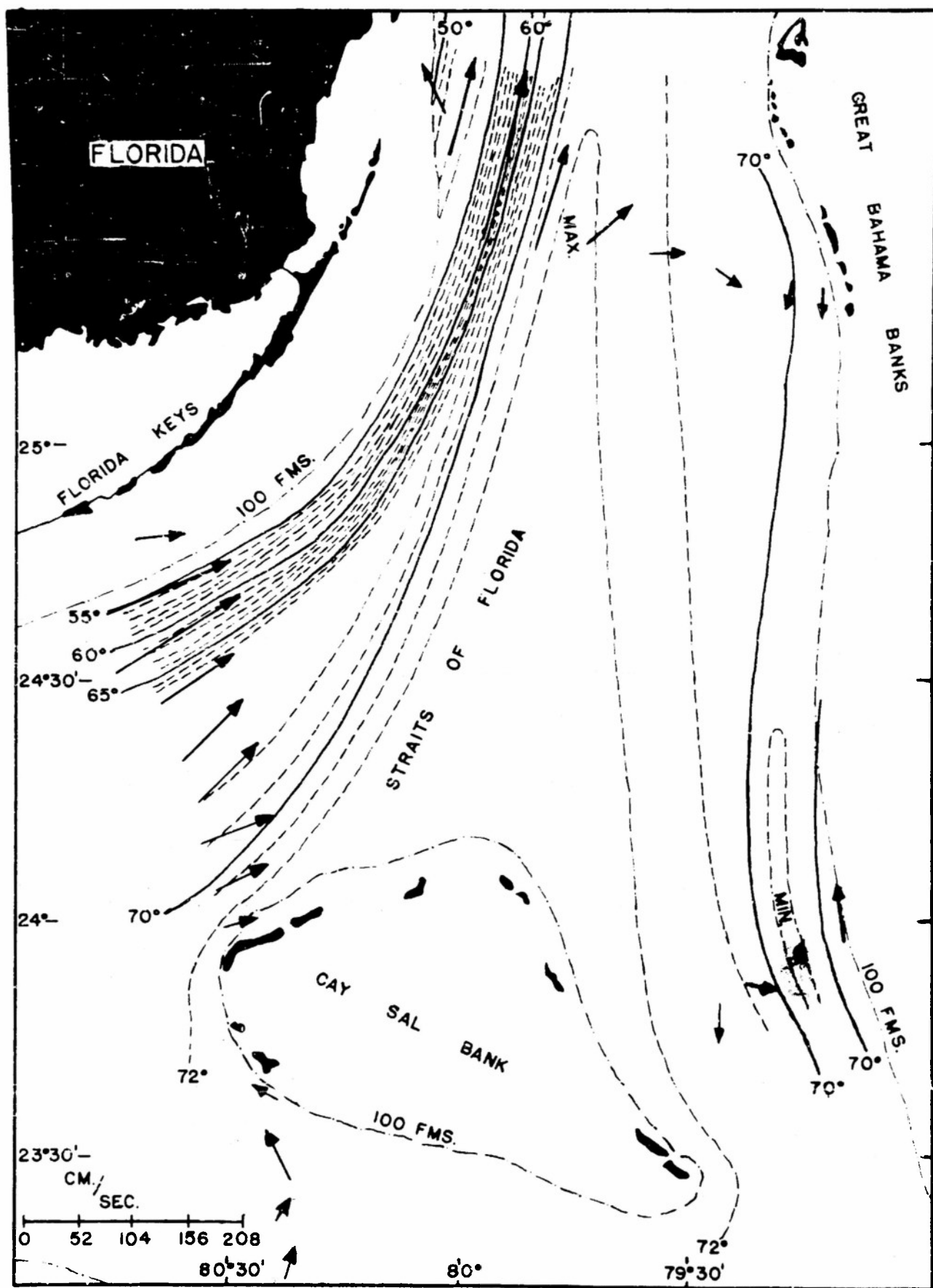


FIGURE C-15

GEK CURRENT VECTORS AND TEMPERATURE AT 200 METERS FOR CRUISE T-347 IN THE CAY SAL BANK REGION.

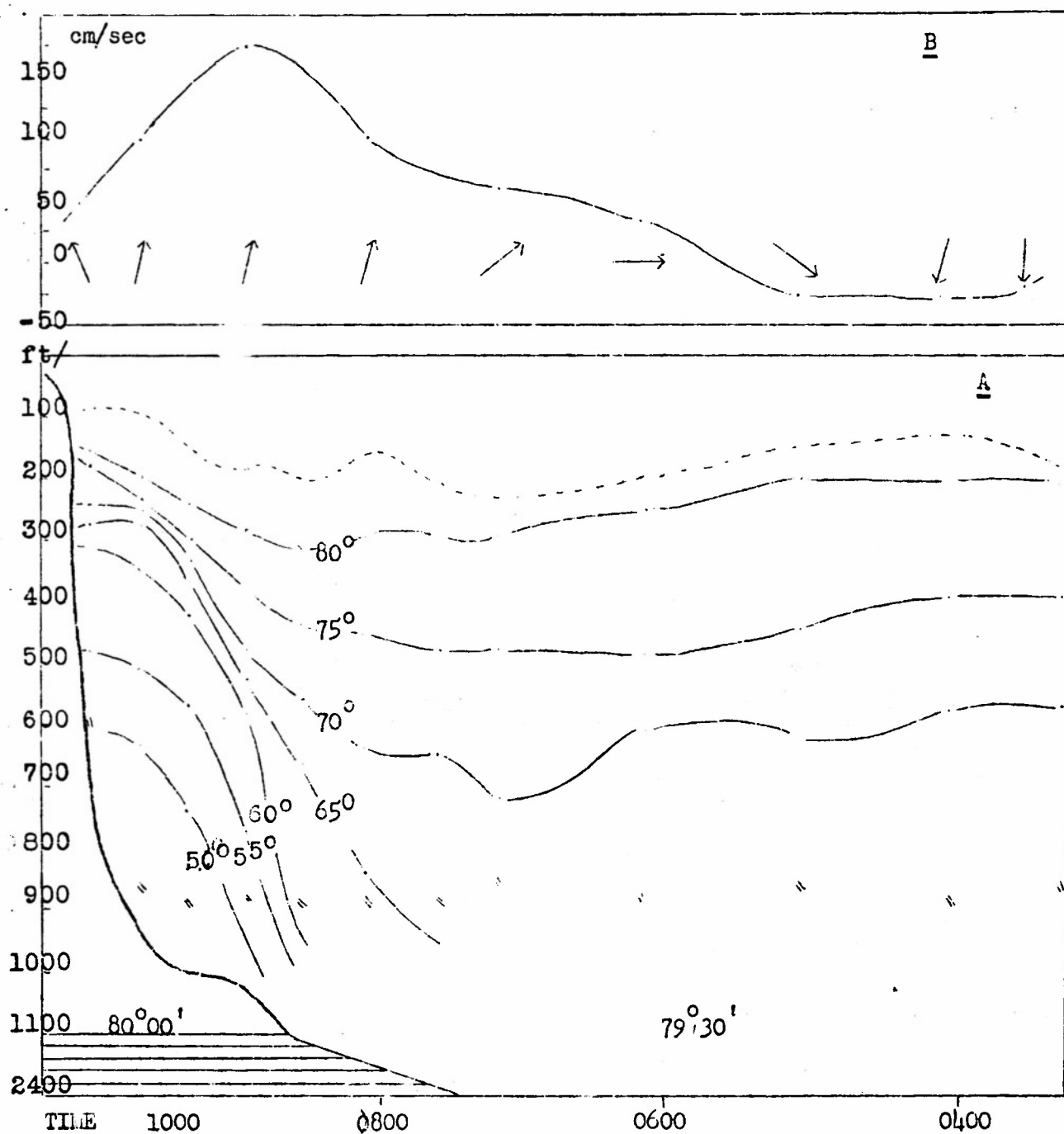


Fig.C-1) A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS

C&D TEMPERATURES AT 100 and 200 METERS

CRUISE T-347 Riding Rock, Bahamas to Miami July 23, 1953

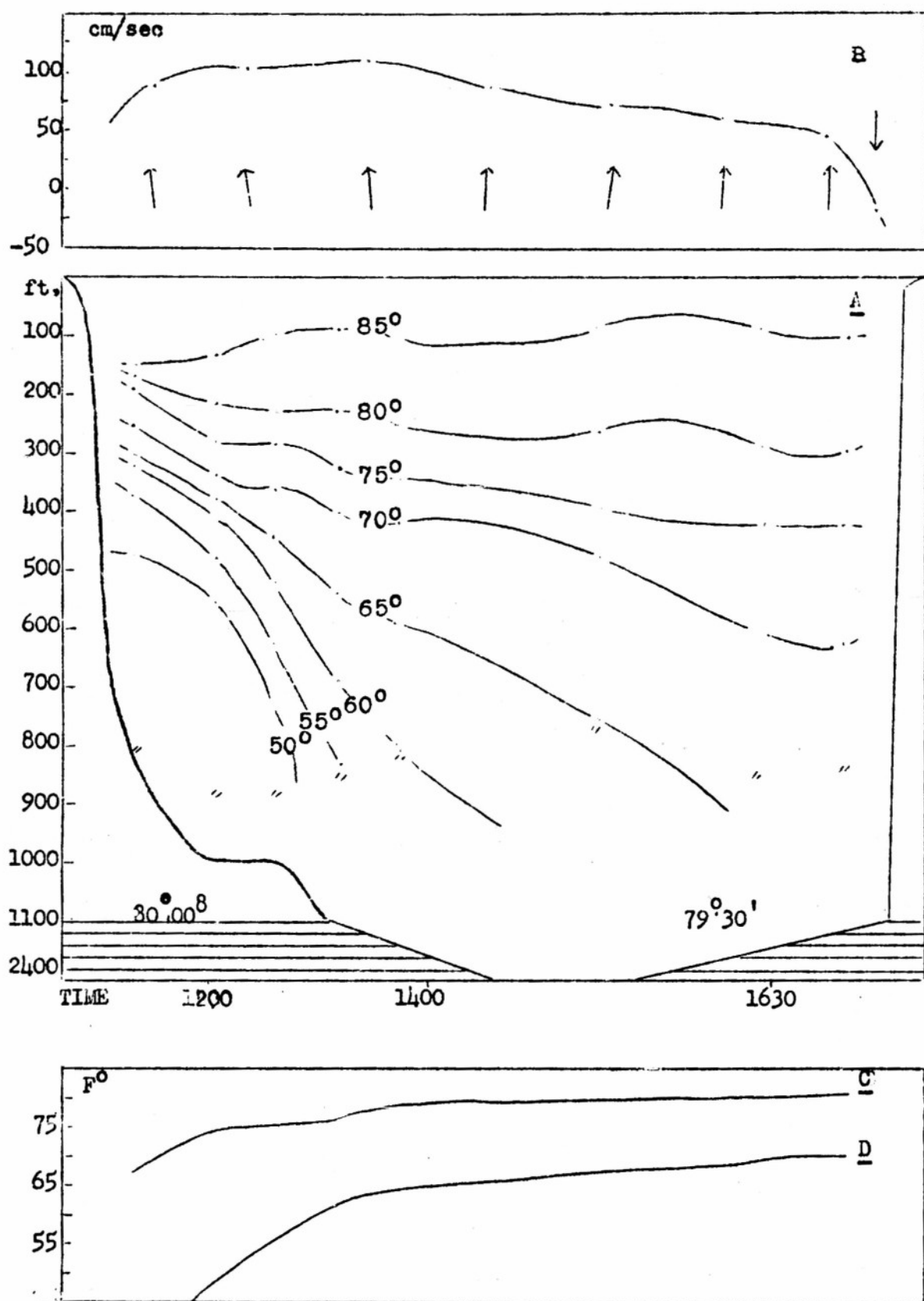


Fig. C-16 A TEMPERATURE-DEPTH PROFILE B GEK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 METERS
 CRUISE T-349a Miami-Cat Cay August 4, 1953

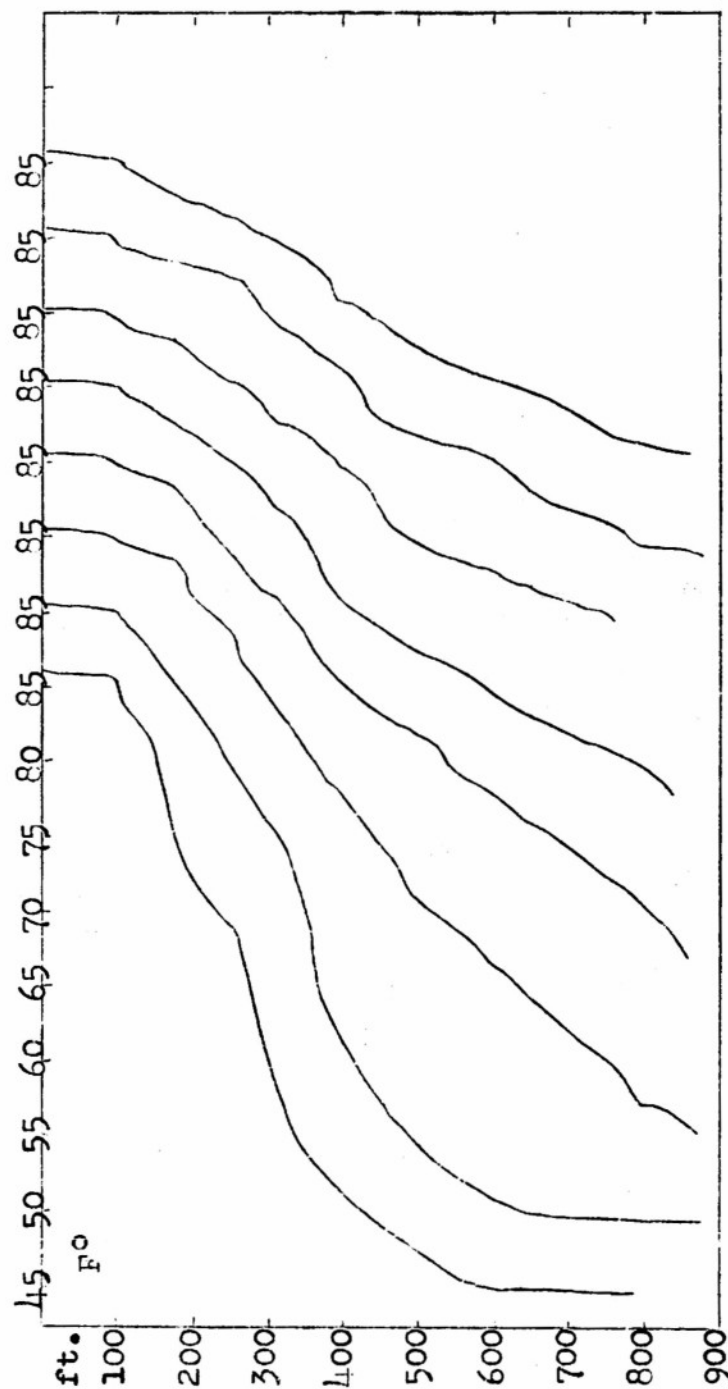
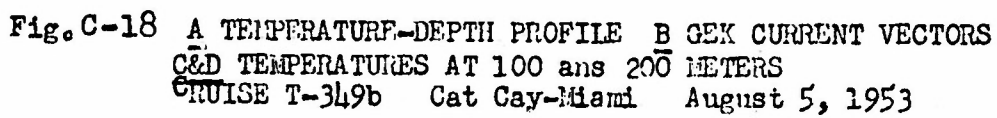


Figure C-17 BATHYTHERMOGRAPH TRACES 1cm = 5°F
CRUISE T-349a



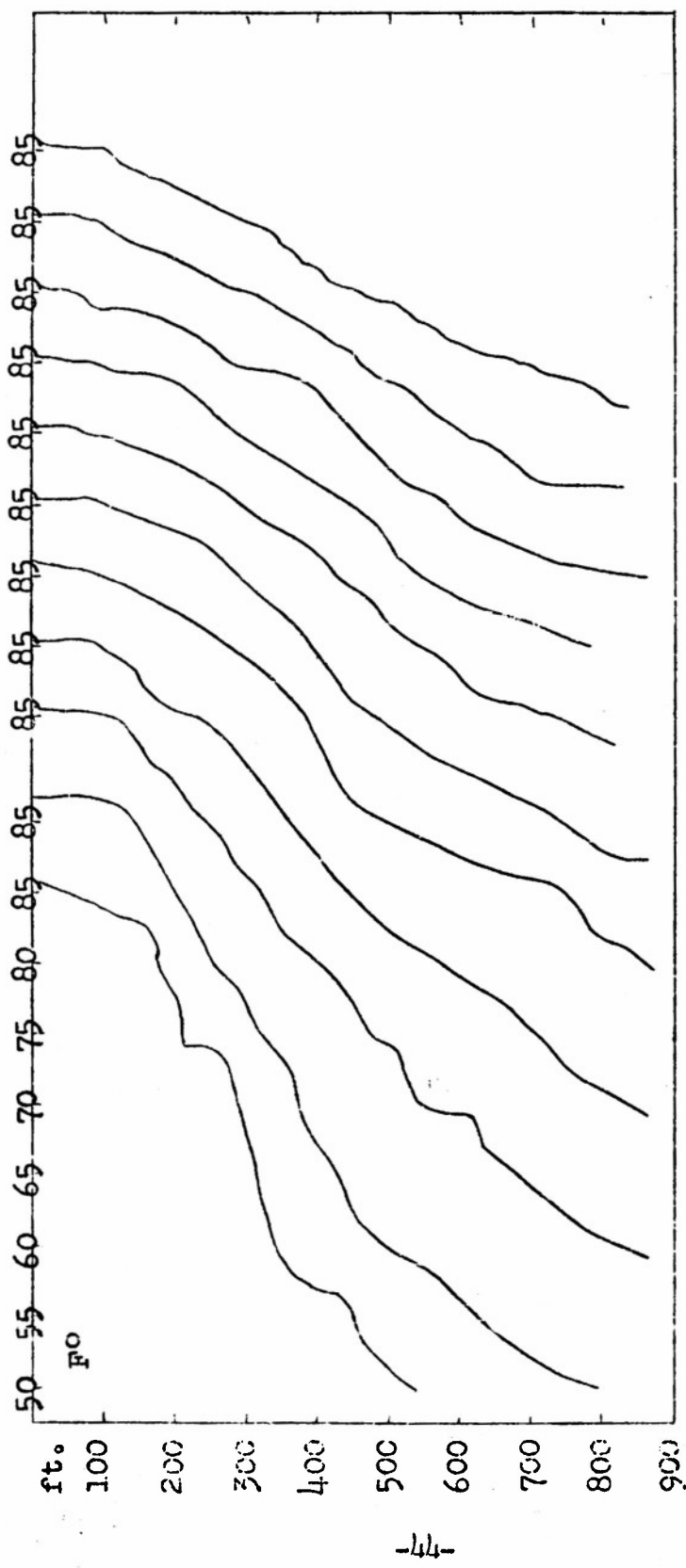


Figure C-19 BATHYTHERMOGRAPH TRACES 1 cm = 5°F
CRUISE T-349b

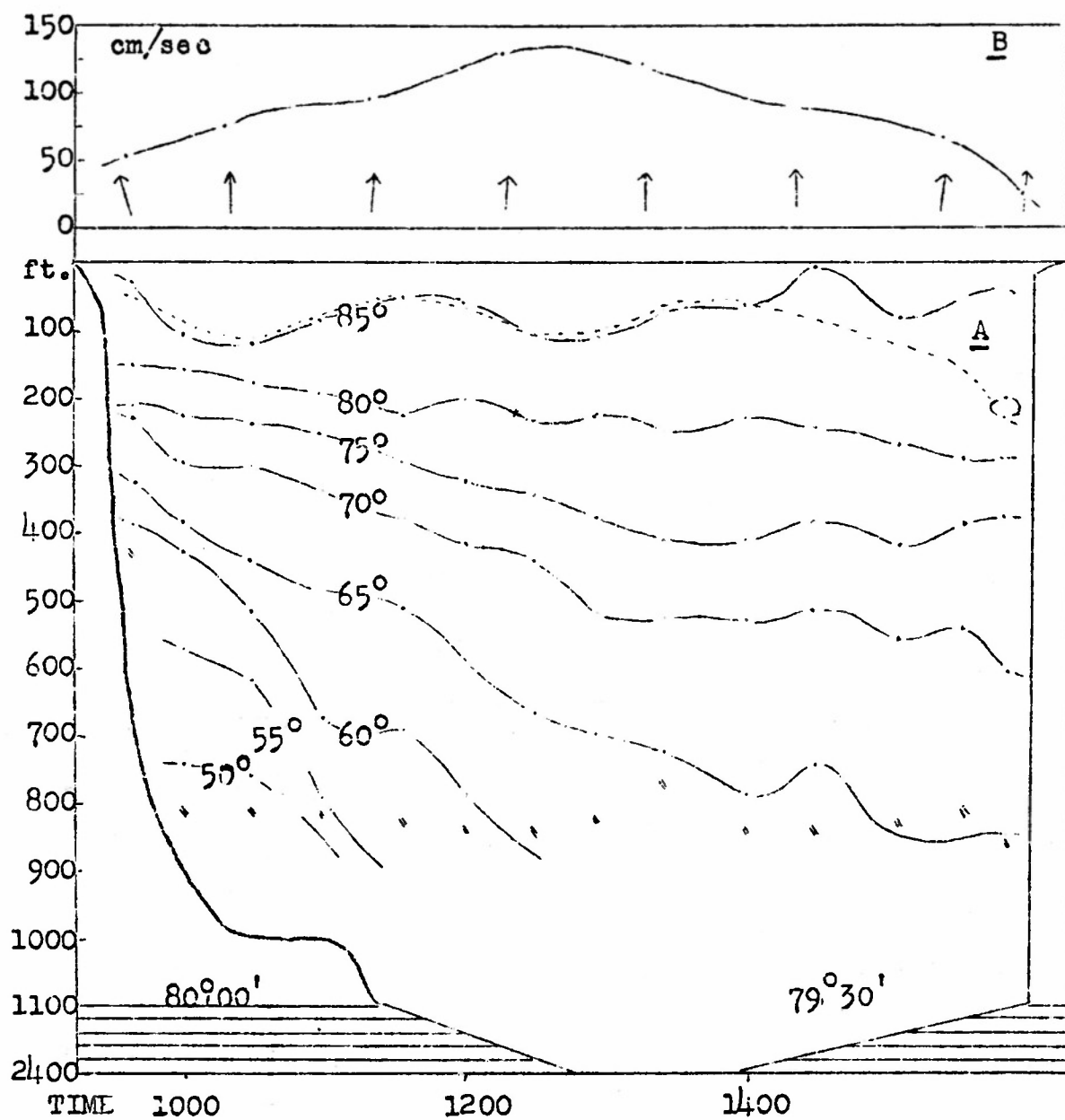


Fig. C-20 A TEMPERATURE-DEPTH PROFILE B GLK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 METERS
 CRUISE T-352a Miami-Cat Cay August 24, 1953

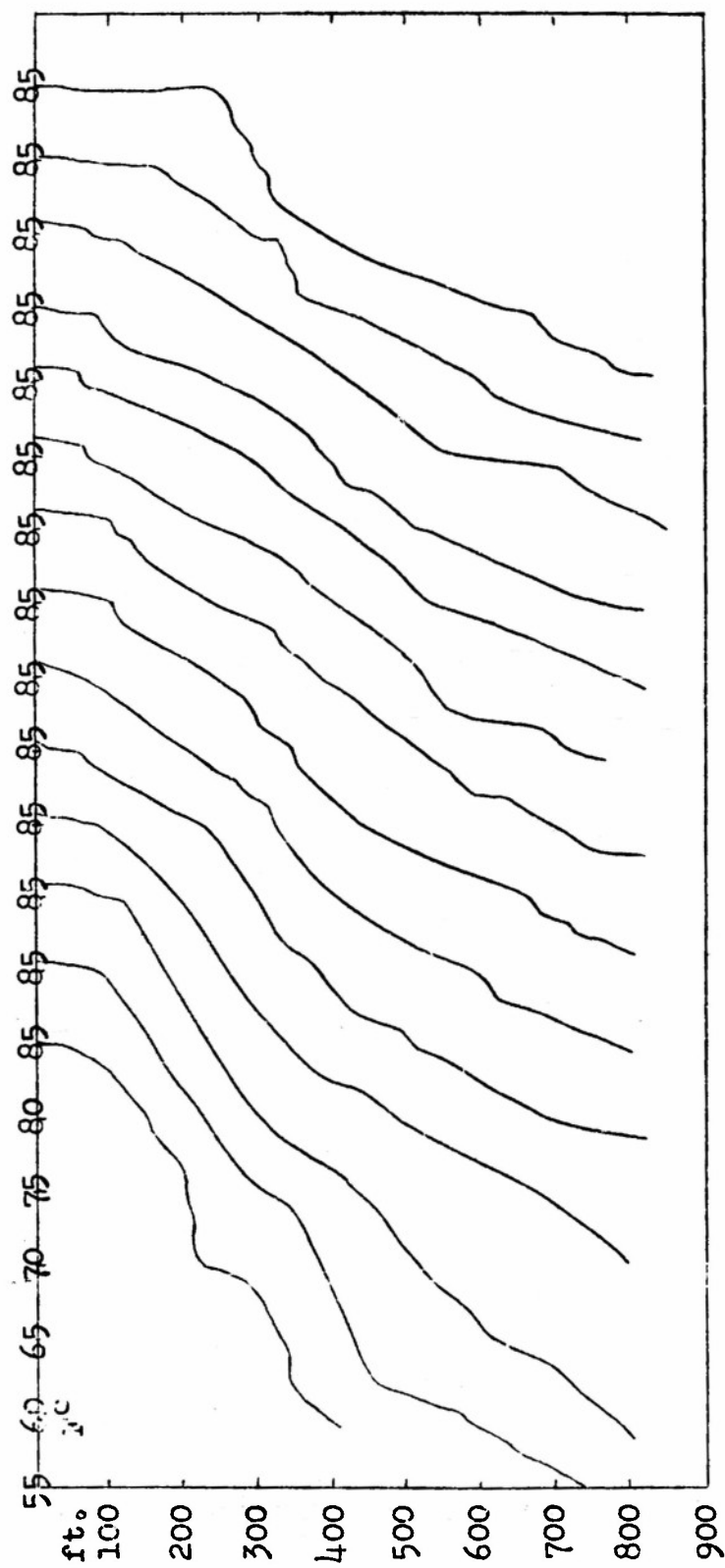


Figure C-21 BATHYTHERMOGRAPH TRACLS 1cm = 5°F
CRUISE T-352a

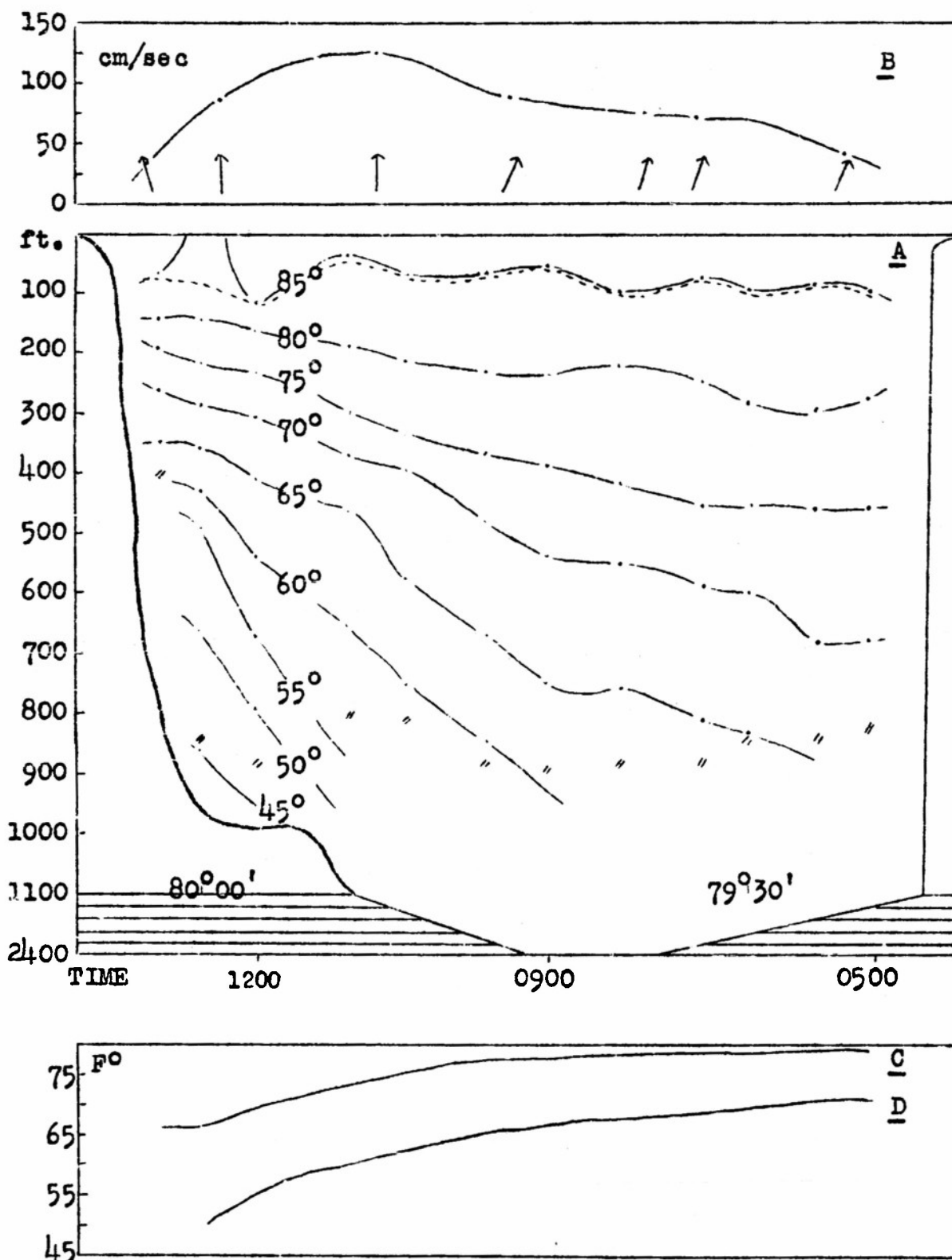


Fig.C-22 A TEMPERATURE-DEPTH PROFILE B GLK CURRENT VECTORS
 C&D TEMPERATURES AT 100 and 200 METERS
 CRUISE T-352b Cat Cay-Miami August 25, 1953

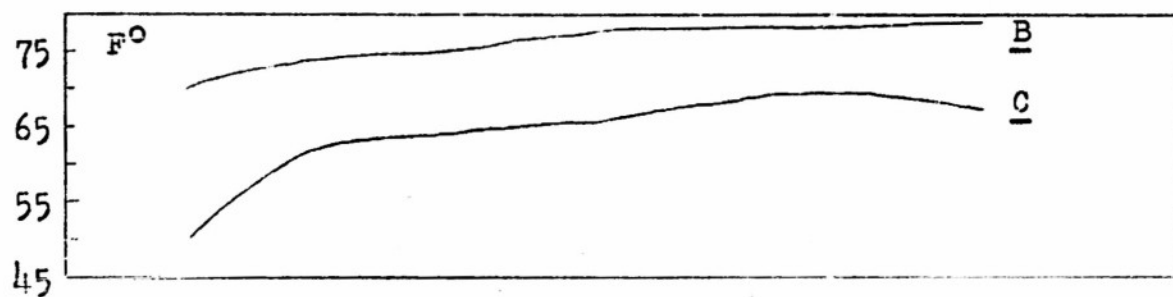
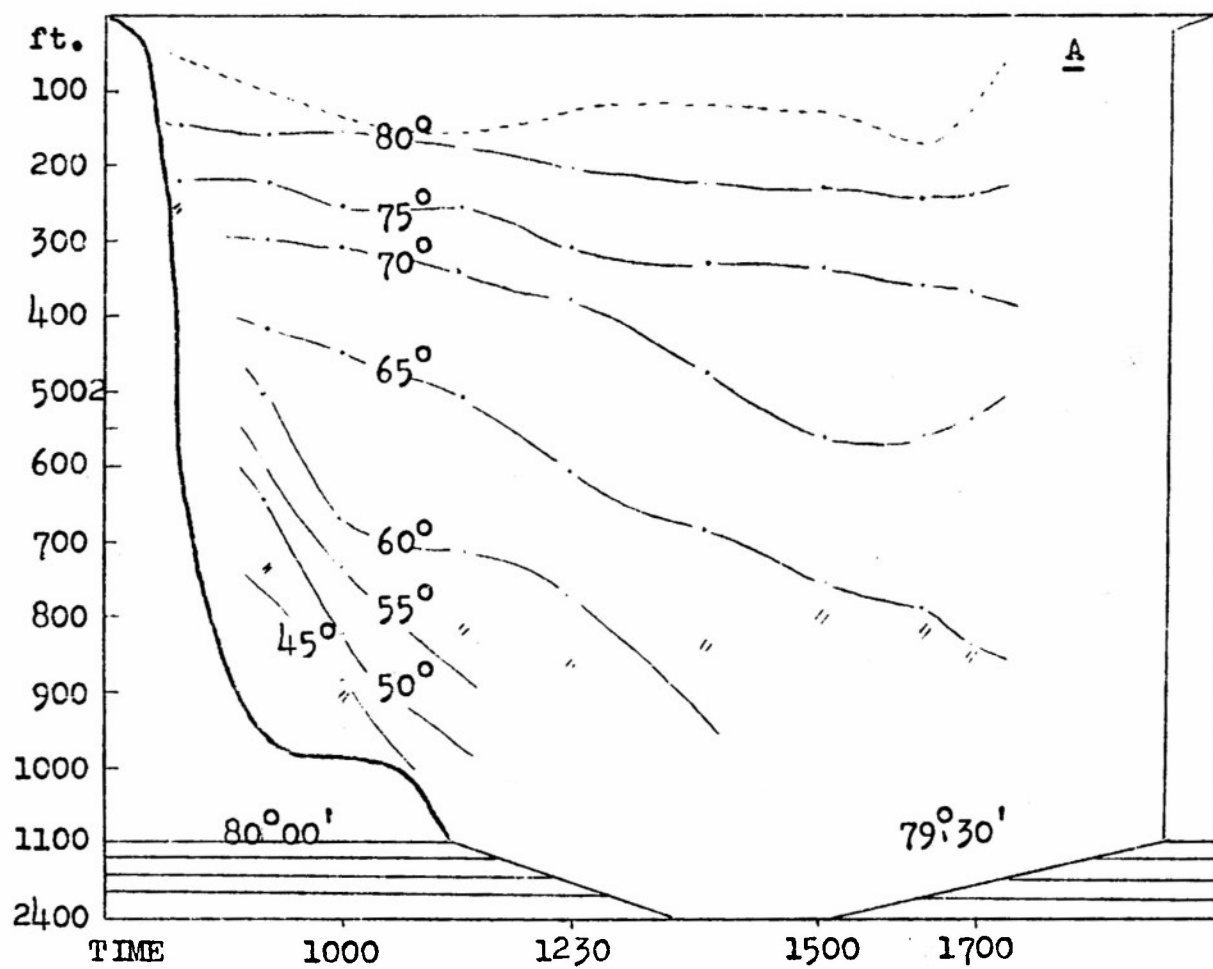


Fig. C-23 A TEMPERATURE-DEPTH PROFILE
 B&C TEMPERATURES AT 100 and 200 METERS
 CRUISE T-353a Miami-Cat Cay September 21, 1953

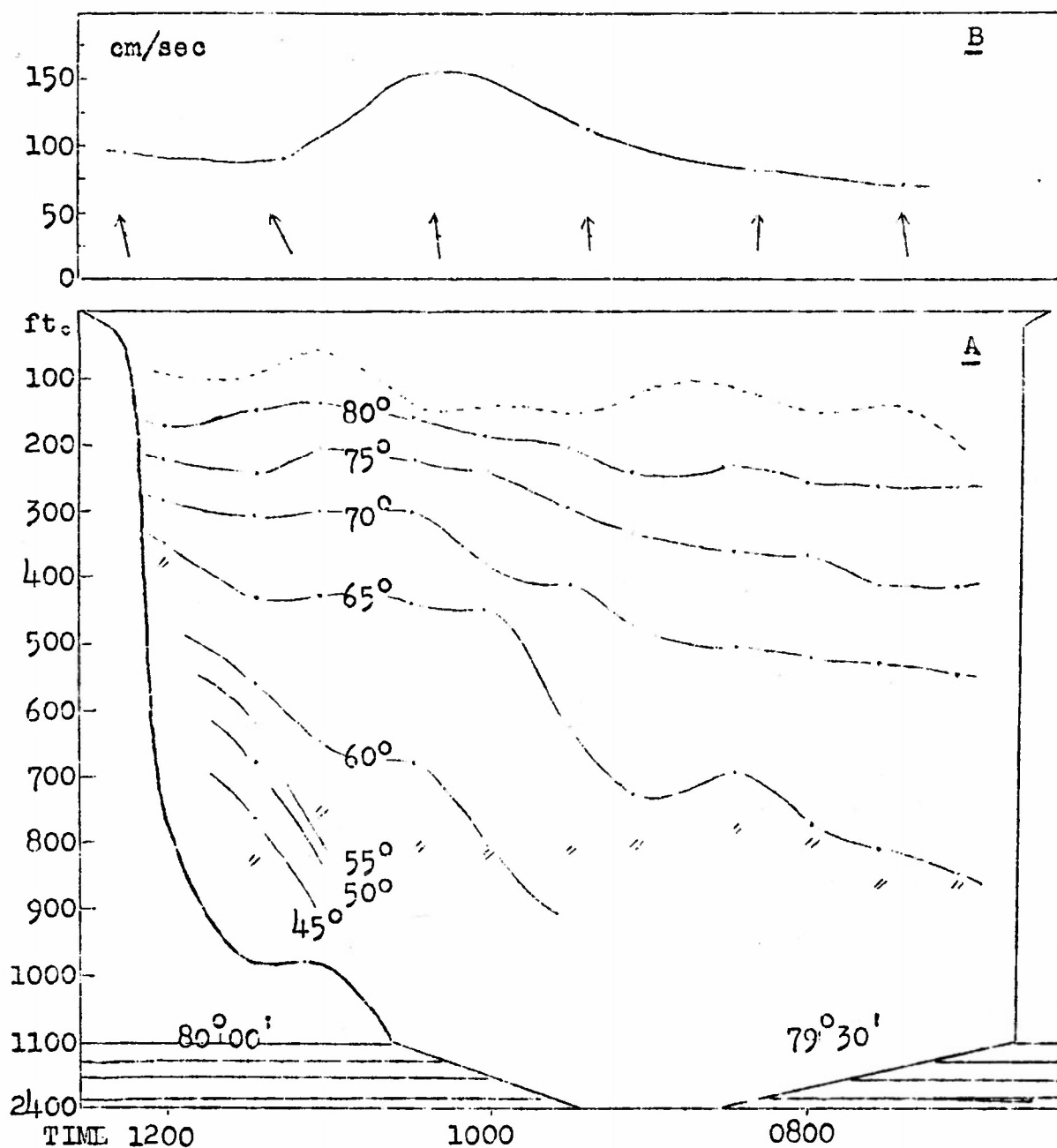


Fig. C-24 A TEMPERATURE-DEPTH PROFILE B GLK CURRENT VECTORS
C&D TEMPERATURES AT 100 and 200 METERS
CRUISE T-353b Cat-Cay-Miami September 22, 1953

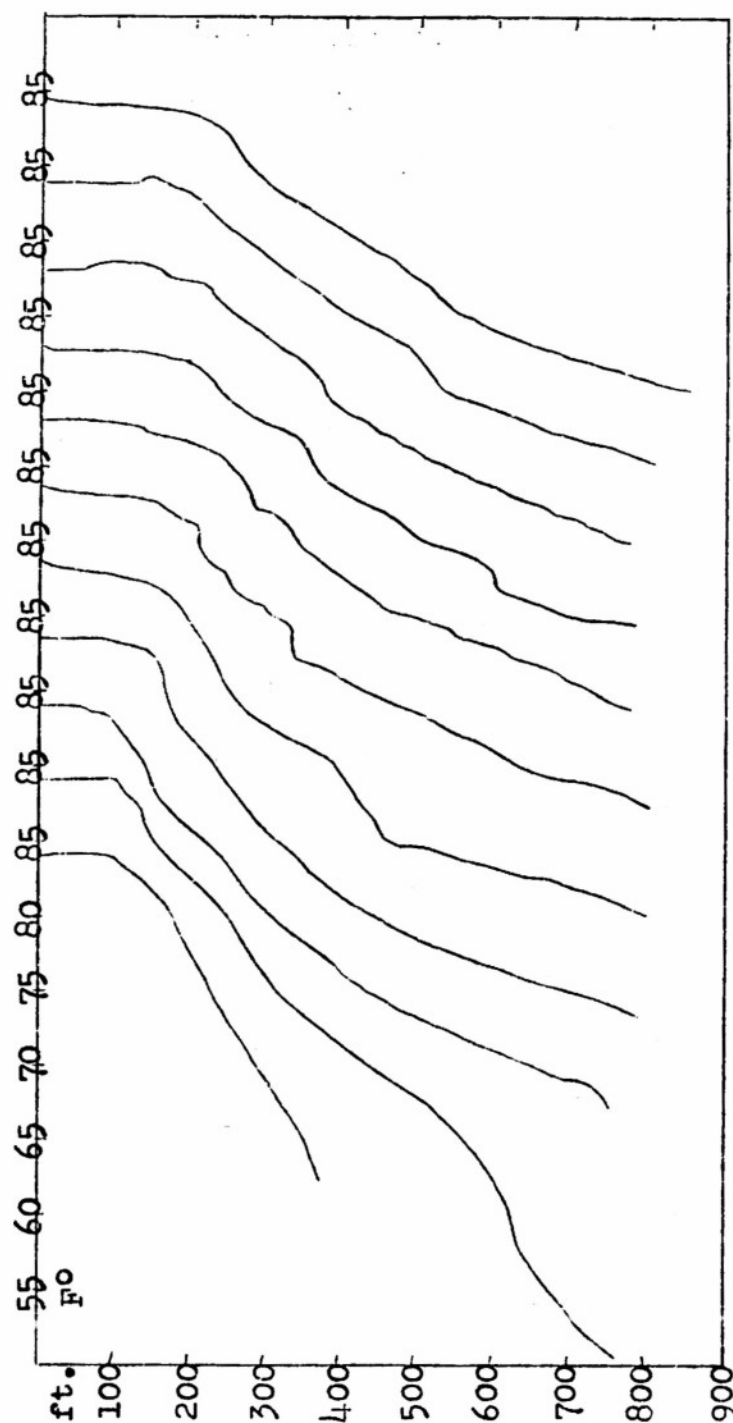


Figure C-25 BATHYMETRIC TRACES 1cm = 50F
CRUISE T-353b

The contouring of the temperatures at 200 meters (Figure C-15) offer little difficulty on the west side of the Current, but on the east side there were several possibilities for different contouring.

The data from the deep hydrographic stations are tabulated in section D of this report. East of $79^{\circ}55'W$. in the Miami - Cat Cay transects there is always water to be found whose temperature-salinity correlation resembles that of Yucatan Channel water. Over the 180-fathom plateau west of $79^{\circ}55'W$. there is water that does not fit this temperature-salinity correlation curve. This water is too fresh to produce the same correlation. (See Figure C-30.) West of $79^{\circ}55'W$. below about 450 ft. the water masses are very much the same as in the Yucatan Channel, as indicated by the close resemblance of the temperature-salinity correlations.

It is not easy to determine, by means of the temperature-salinity correlations, the exact location of the source of this fresher water.

(1) A partial cause might be in a constant mixing of Florida Current water with local inshore run-off water. However, the amount of water brought into the Straits of Florida by local run-off is almost negligible compared with the amounts necessary to change the temperature-salinity correlations in the observed manner. In addition, there are usually two or three sharp lines of strong color change to be noticed from the Florida shore seaward which would indicate non-mixing.

(2) For this reason, the only feasible explanation is in the less saline water derived from the northeast section ("Bank water") of the Gulf of Mexico, as already shown by several authors. A typical temperature-salinity correlation curve for the "Bank water" is, however, not easy to draw. For instance, stations 3-1c 3-25, made by the U.S. Fish and Wildlife Service Vessel ALASKA (Oceanographic Survey of the Gulf of Mexico, Project #24, The

A&M College of Texas, Dept. of Oceanography) were used to plot T-S correlation curves. It was found that the averaged curve more nearly fits that of the Yucatan Channel water than that of the water in question. However, the best evidence for the origin of this less saline water is given by stations in the northern section of the transect between the Key West region and Cuba. DANA Station 1226 (24°16'N 82°47'W) south of the Dry Tortugas at a depth of 575 meters shows very much the same temperature-salinity correlation pattern as found in the western part of the Miami-Cat Cay section. In future, this problem of the effect of the Gulf of Mexico waters on the waters in the Straits of Florida will be given particular attention.

In this connection it is interesting to note that ATLANTIS Stations 1613, 1614 and 1615 of the Cape Canaveral Section, 1621 of the Jacksonville Station and 1637 of the Onslow Bay Section show water with T-S correlations similar to the less saline water off Miami.

In comparing Pillsbury's observed values for temperature and salinity for this transect across the Florida Current with those made recently by this laboratory, it is noted that the patterns are very much the same. The temperature pattern does change slightly with the season, but the salinity pattern remains remarkably the same. The salinity maximum on the east side is at a depth of about 200 meters and on the west side at about 100 meters. The magnitudes of the maxima are also very close.

In comparing these later sections with Wüst's (based on Pillsbury's data), with regard to surface velocities, one seems to find a vast difference. The average surface current for the Florida Current as shown by Wüst is 110 cm/sec, or 2.14 knots. The local seamen, in making their runs across the Current, estimate it at 3 knots, and the average for 23 crossings, made by this Laboratory, is 2.9 knots. (Table C-1). Wüst's diagram indicates no

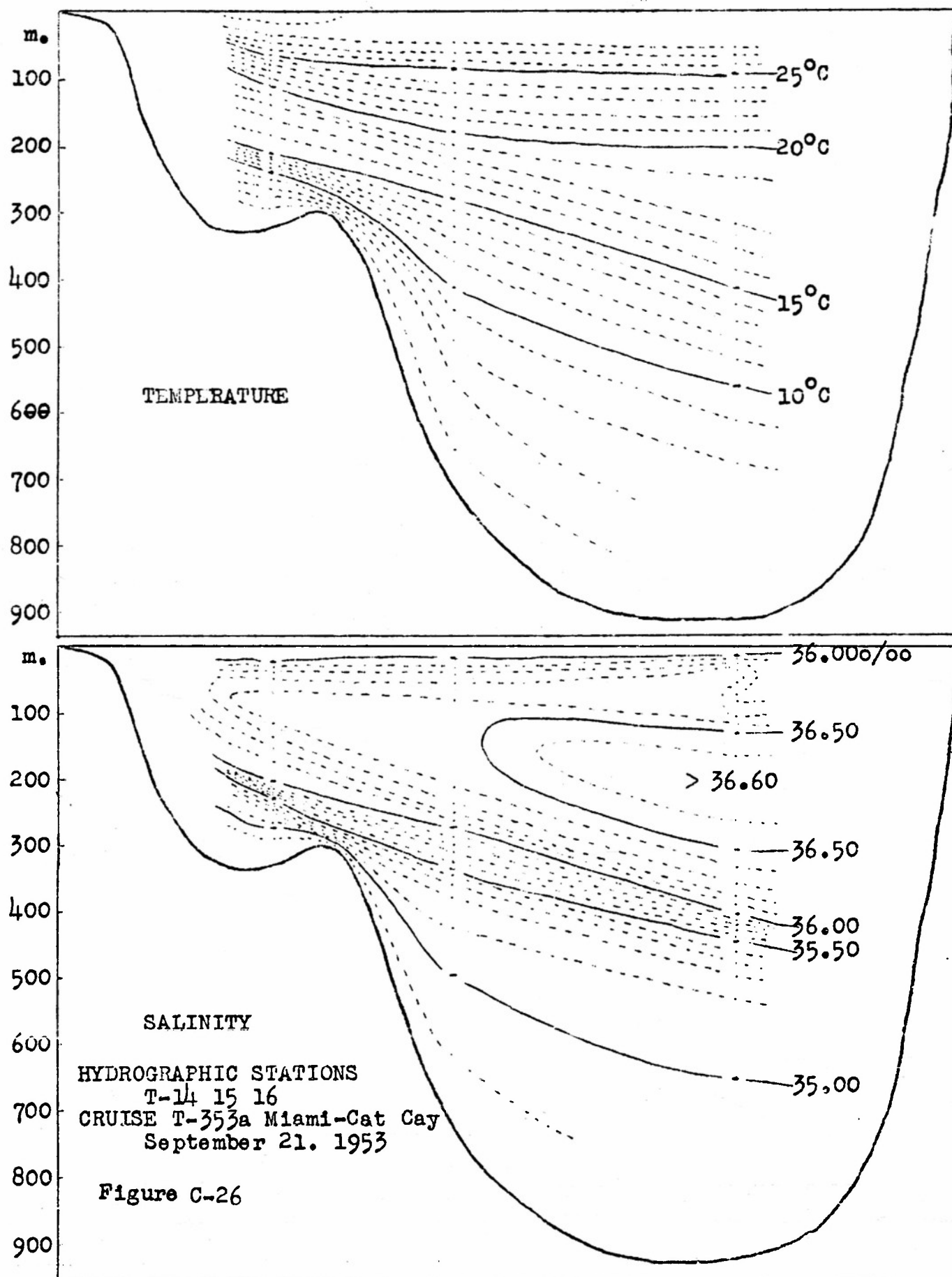
TABLE C-1

SEASONAL CYCLE OF MEAN SURFACE CURRENT VELOCITIES
MASS TRANSPORTS AND GEK "K" FACTORS

CRUISE	DAY	MO.	YEAR	MEAN SURFACE VEL. BY SET cm/sec	MASS TRANSPORT 10^6 cu m/sec	"K" FACTOR
T-240a	21	Dec.	1952	154	40.5	2.16
T-302a	4	Jan.	1953	159		
T-302b	5			190		
T-304a	14			148		
T-304b	15			140		
T-307b	21			171		
T-311b	17	Feb.		183	43.5	2.20
T-313b	27			141	21.0	1.54
T-315a	12	Mar.		175	26.6	1.55
T-320a	26			143		
T-320b	27			125	24.5	1.84
T-323a	28	Apr.		158	23.0	1.39
T-323b	29			153		
T-331a	26	May		193	19.0	1.30
T-334a	9	June		198		
T-330a	25			162	35.0	2.00
T-344b	7	July		71		
T-347	23			116		1.52
T-349a	4	Aug.		154	31.4	1.95
T-352a	24			161	29.6	1.76
T-353b	22	Sept.		131	19.4	1.45
T-358b	24	Oct.		56	4.7	1.23
T-364b	24	Nov.		147	31.4	1.65
<u>Mean + standard deviation</u>				$\frac{148.5 + 34.9}{2.9 + 0.7}$ cm/sec knots	$\frac{26.9 \pm 9.8}{1.68 \pm 0.30}$	

surface velocity higher than between 160 and 179 cm/sec, or 3.4 knots. There must be much higher velocities in order to produce an average of 3 knots for the whole Current. However, very slow currents have been encountered even in the axis of the Current, as shown in Figures C-28 and Table C-1.

During this project crossings of the Florida Current were made every month of the year, and with the exception of January there is a CEK record for every month. In Table C-1 and Figure C-31 are the reductions of the observations made during these crossings showing the mean surface current as



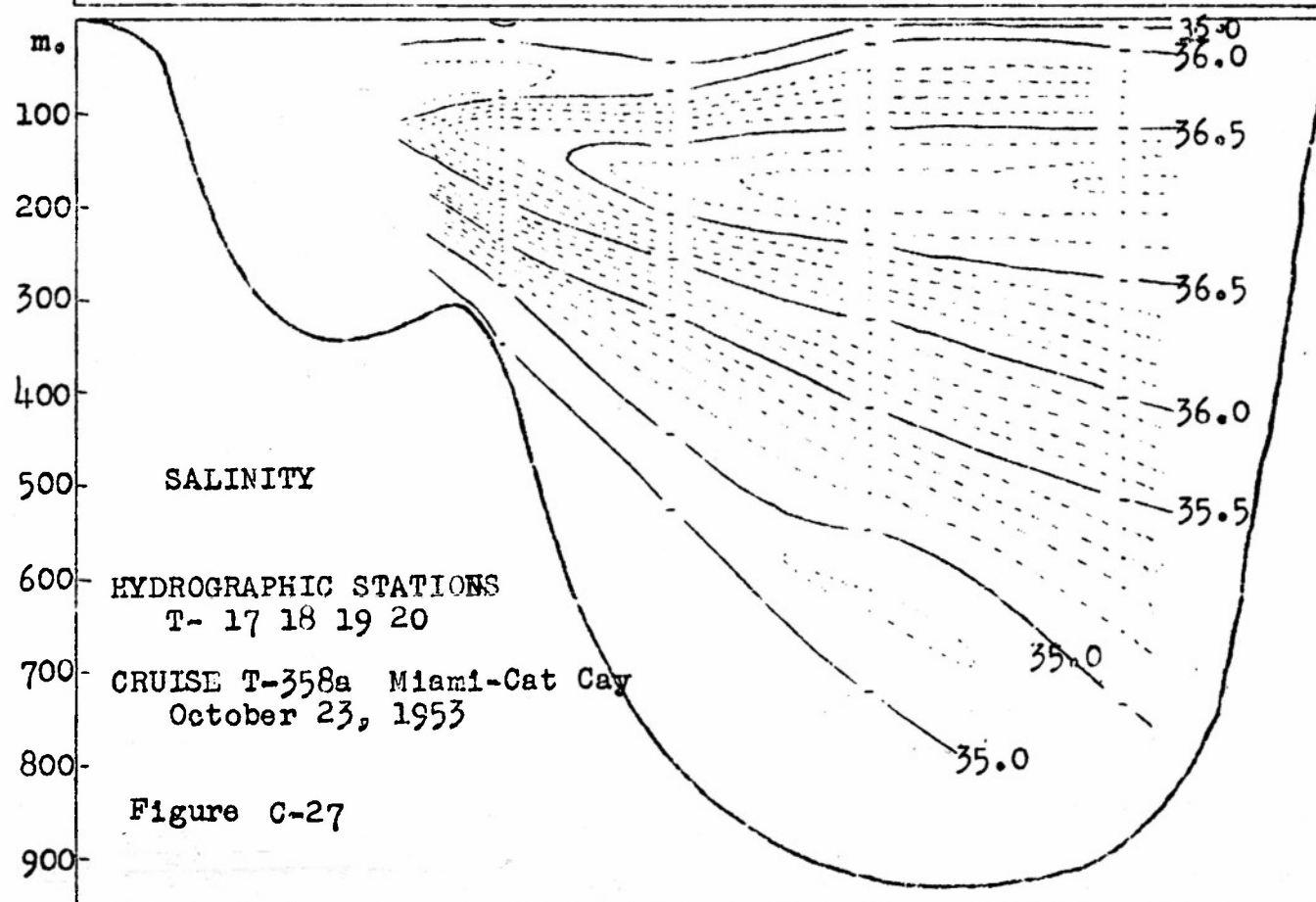
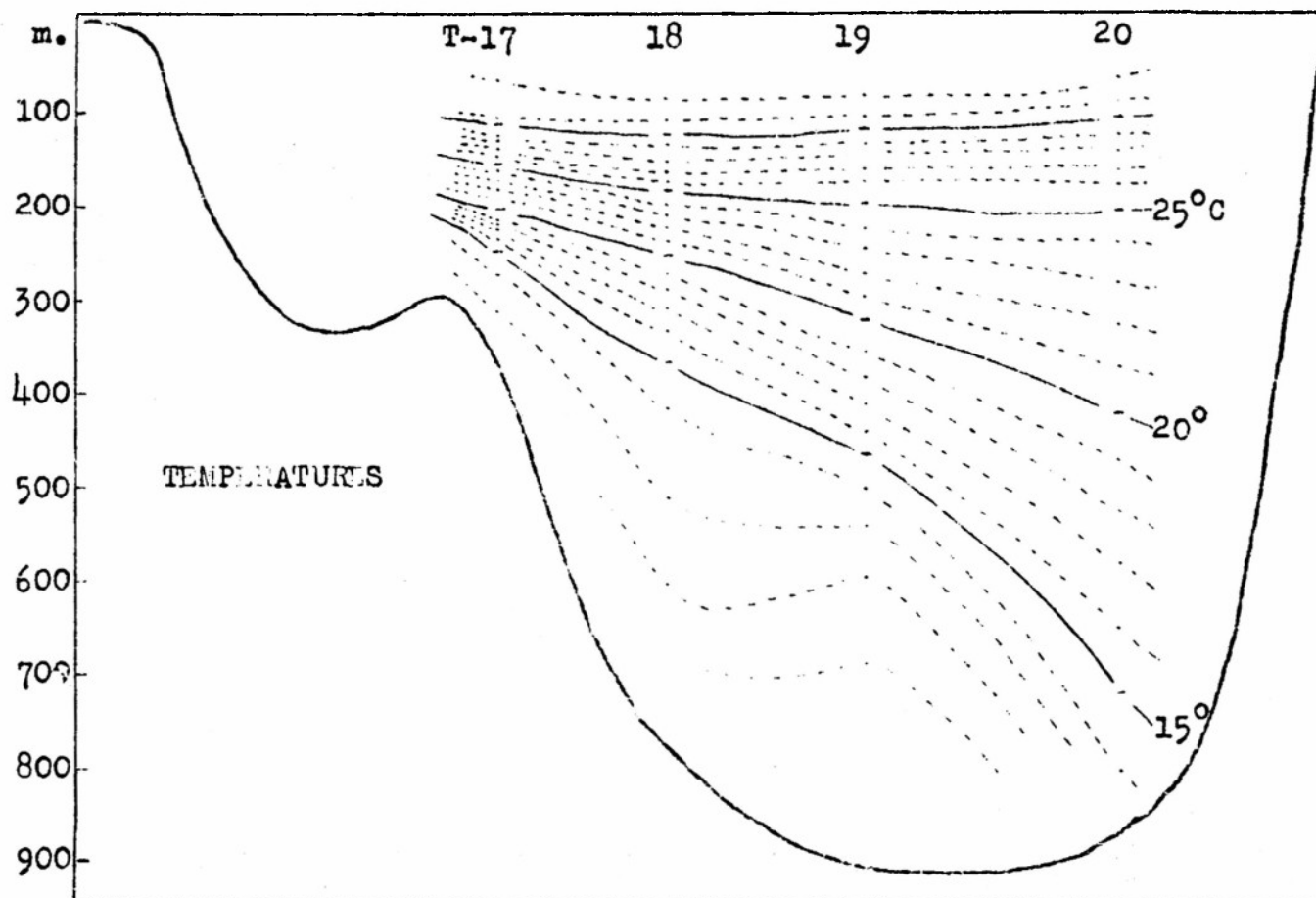


Figure C-27

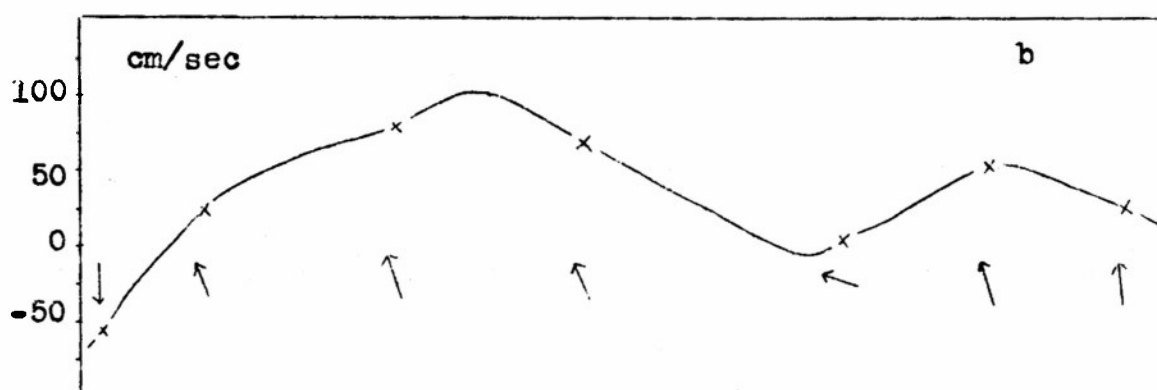
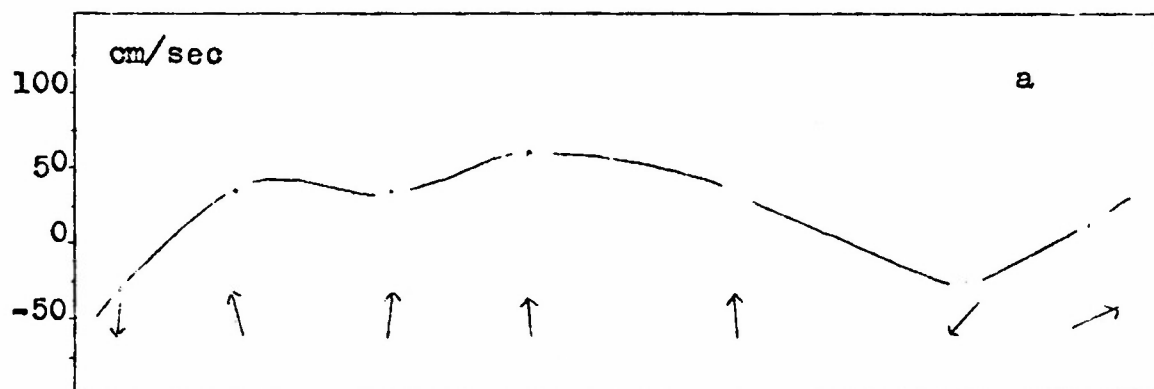


Fig.C-28 GEK CURRENT VECTORS
CRUISE T- 358a & b Miami-Cat Cay-Miami
October 23, 24, 1953

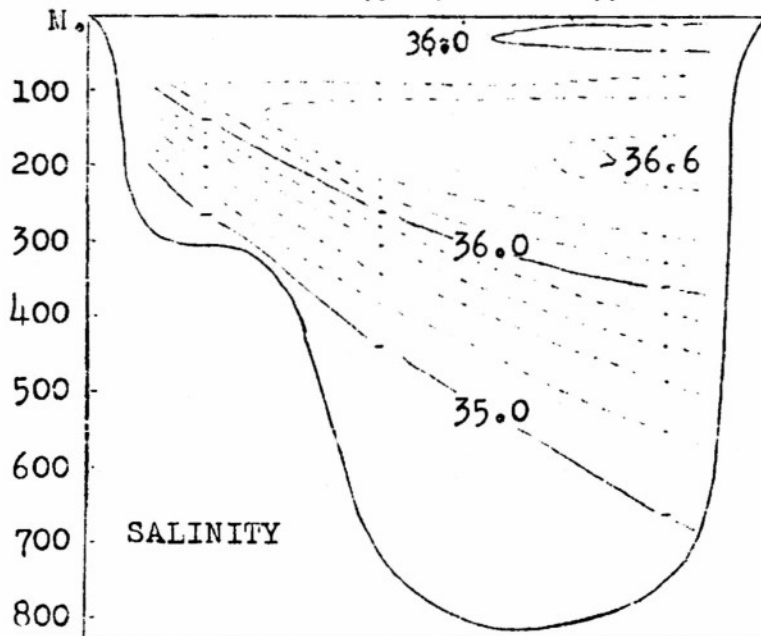
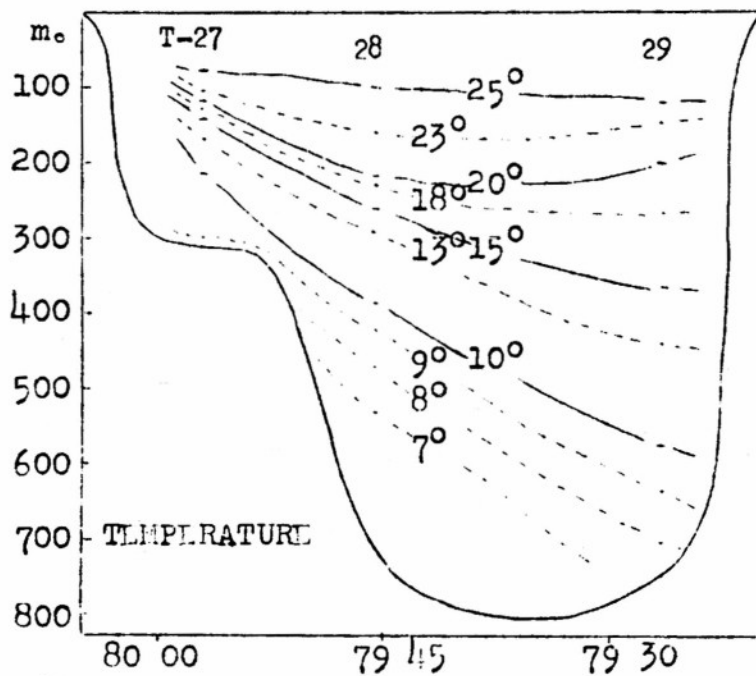
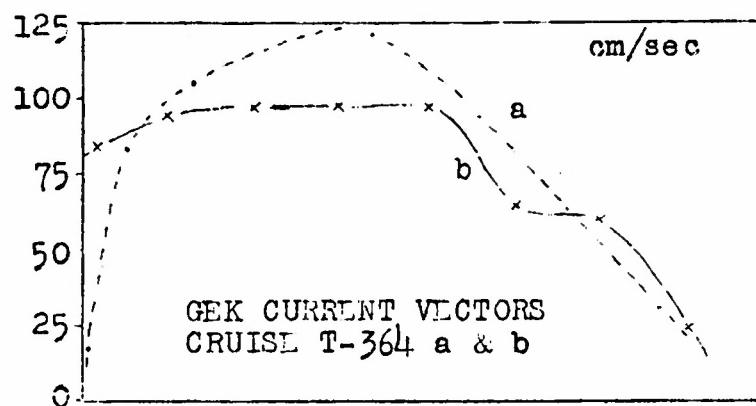


Figure C-29 HYDROGRAPHIC STATIONS T-27 28 29
CRUISE T-364a Miami-Cat Cay Nov. 24, 1953

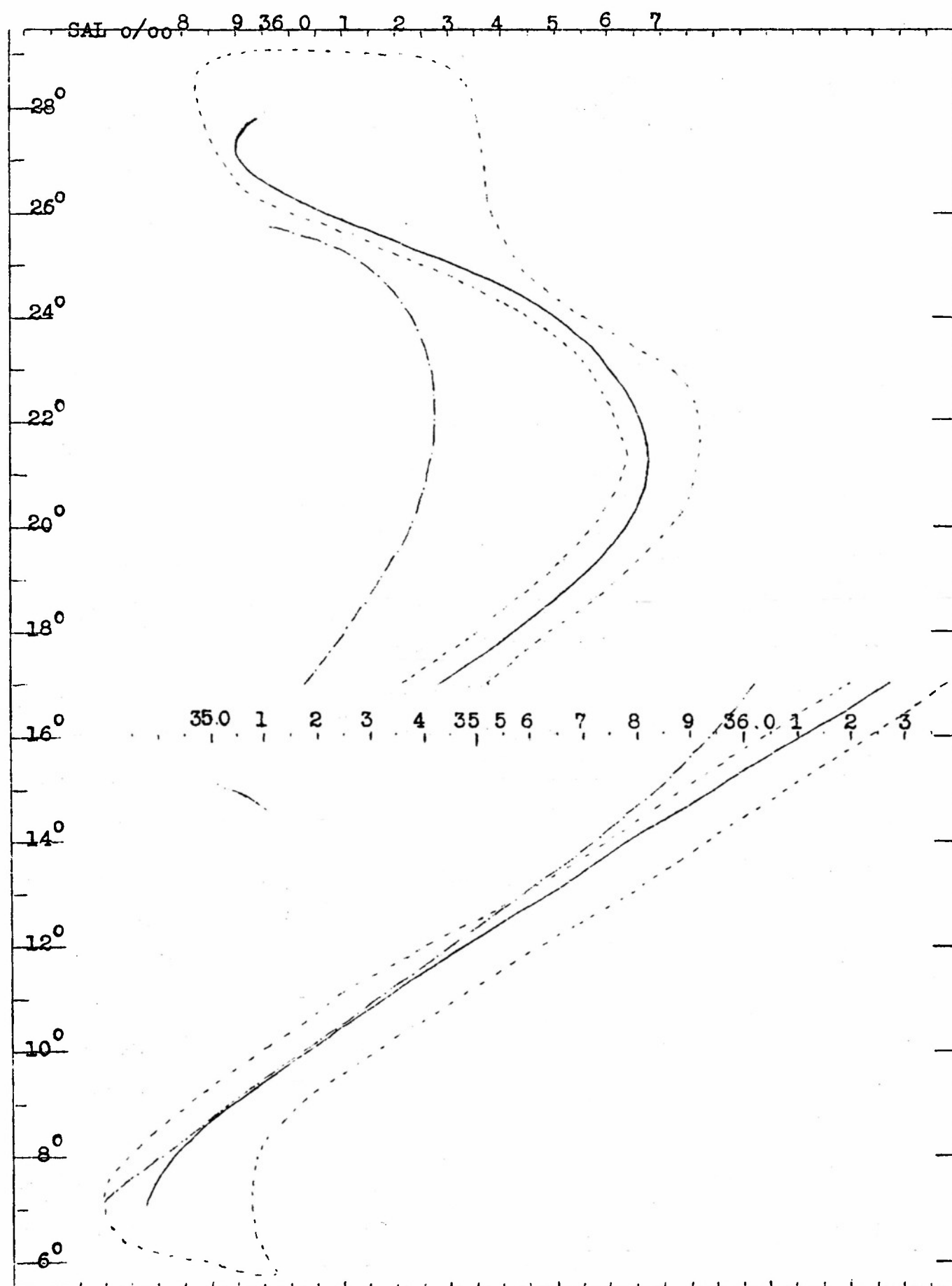


Figure C-30 TEMPERATURE-SALINITY CORRELATION
 Solid line--Yucatan Channel Water Dash dot line--western edge
 of Current Dotted line encloses Florida Current Water

given by the total set of the ship, the computed mass transport (Marine Lab., U. of Miami, Tech. Rep. 53-9) and the "K" factor of the GEK. The range of variation is indicated by the standard deviation.

$$S_x = \frac{(x - \bar{x})^2}{N}$$

There are observations here that are at present impossible to explain. During Cruise T-331 the set of the ship was greater than usual, and the currents measured by the GEK were greater than usual, but the computed mass transport is lower than average. During Cruise T-324 May 8, which was north of the usual transect (Lake Worth to Settlement Point) high velocities were recorded, and in the early part of June the ship was set much more than usual during Cruise T-334.

During Cruise T-344b on July 8th the ship was set only seven miles in 5.08 hours, or a mean surface current of 71 cm/sec. The wind was Beaufort Force 2 from 200 degrees. The GEK was not in operation during this cruise. It was thought that perhaps the depth of the isothermal layer would be much greater than usual indicating a deeper surface current, but this was not found to be the case. Perhaps there were countercurrents on each side of the main current.

Again during Cruise T-358b a very slow current was encountered. The total set of the ship was 5.8 miles in 5.38 hours or a mean velocity of 56 cm/sec. During this transect the GEK was in operation and also recorded low velocities. Its accumulated set shows a total set of 4.7 miles in the same time. There had been a strong wind, Beaufort Force 5, from the north for three days that had helped to knock down the current and also to produce countercurrents on each side (See Figure C-38). No bathythermograph was available, so it was impossible to measure the depth of the isothermal water.

Countercurrents have been recorded by the GEK during five transects.

These are: T-320b (Figure 11 of previous report)
T-324 (Figure C-1)
T-347 (Figure C-14)
T-349a (Figure C-16)
T-358a (Figure C-28)

It is hoped to have a recording current meter buoyed near the western edge of the Current to correlate the existence of countercurrents with meteorological phenomena and the tides.

Usually a well defined shear area exists between two and three miles east of the Miami Sea Buoy. On a calm day this area will show north-south slicks and weed lines, and occasionally a rip is noticed. If the water is not too disturbed, there exists a rather sharp color change. There are stronger color changes closer to the Sea Buoy. Figure C-32 is a reproduction of a GEK record made during Cruise T-364a in this area. Notice the change of velocity in the shear area from 21 cm/sec to 83 cm/sec within ten minutes while travelling at a speed of eight knots. This would represent a distance of one and a third nautical miles.

On the eastern side of the current two or three miles from the Bahama Banks the water at times shows a simple current pattern and at other times the GEK records a stringy pattern showing areas of decreasing velocity and increasing velocity very close to each other. These may be noticed from shipboard, and appear as areas of slick, weed line and change in wave or ripple form.

The seasonal cycle of temperatures is graphed in Figure C-33. Three columns of water were chosen; one at the speed axis of the current $79^{\circ}47'W$, one on the western edge of at $80^{\circ}00'W$ and a third at the eastern edge at $79^{\circ}25'W$. Depths of 50 ft., 250 ft. and 450 ft. were chosen as representative depths. All of the points in Figure C-33 are from bathythermograms except those with a parenthesis taken in November and December during hydrographic

stations. At least down to 250 ft. there is a gradual warming from the middle of February to the end of August followed by more rapid cooling. At 450 ft. this cycle is less pronounced and the warmest period is apparently already between June and July, two months earlier than in the surface layers.

This pattern corresponds closely to the cycle of surface heating and of wind velocity in the Sargasso Sea area. (It is possible that most of the water down to below 200 meters in the Florida Current originally comes from the general area of the Sargasso Sea.) There the surface temperatures reach a maximum near the end of August. By June the strong spring winds have subsided resulting in diminished stirring. For this reason less heat is transferred downward, and the temperature at 450 ft. starts to decrease in the June-July period. This is possibly due to the vertical mixing below the stable surface layer, but more probably due to the upshift of cooler deeper water closer to the surface which might occur in connection with the increased surface current speed. This could be demonstrated in detail, for instance, by a statistical treatment of BT traces chosen from every month at each of the three columns of water. These traces could be compared with bathythermograms from the Sargasso Sea.

It is also noted that the temperatures on the western edge of the Current show a much greater scatter than those at the axis or eastern edge. This phenomenon has been discussed in (53-9 Technical Report 1 June 1953, The Marine Laboratory, The University of Miami)

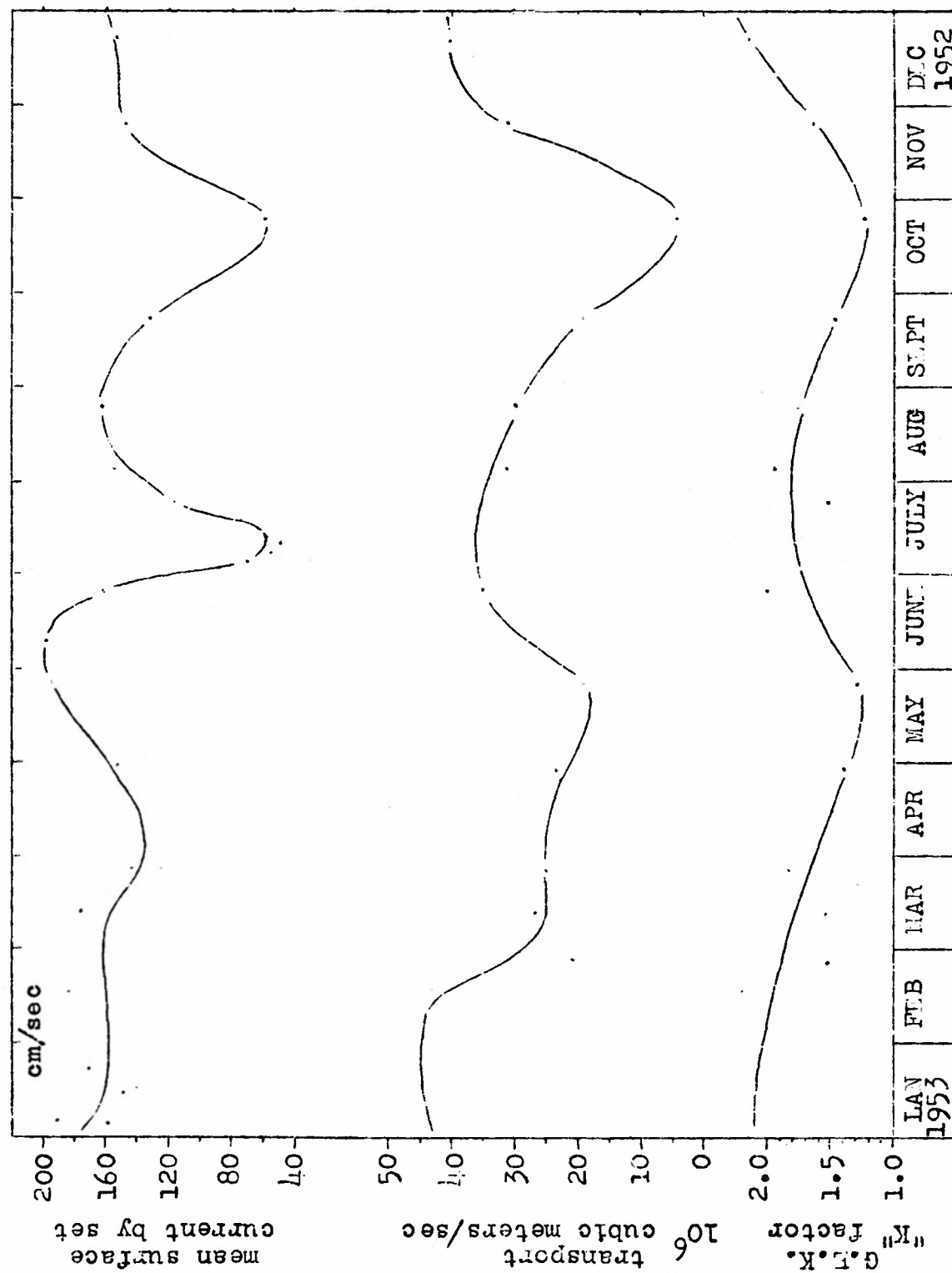


Fig. C-31 SEASONAL CYCLE OF MEAN CURRENT VELOCITIES, MASS TRANSPORT AND G.E.K. "K" FACTORS

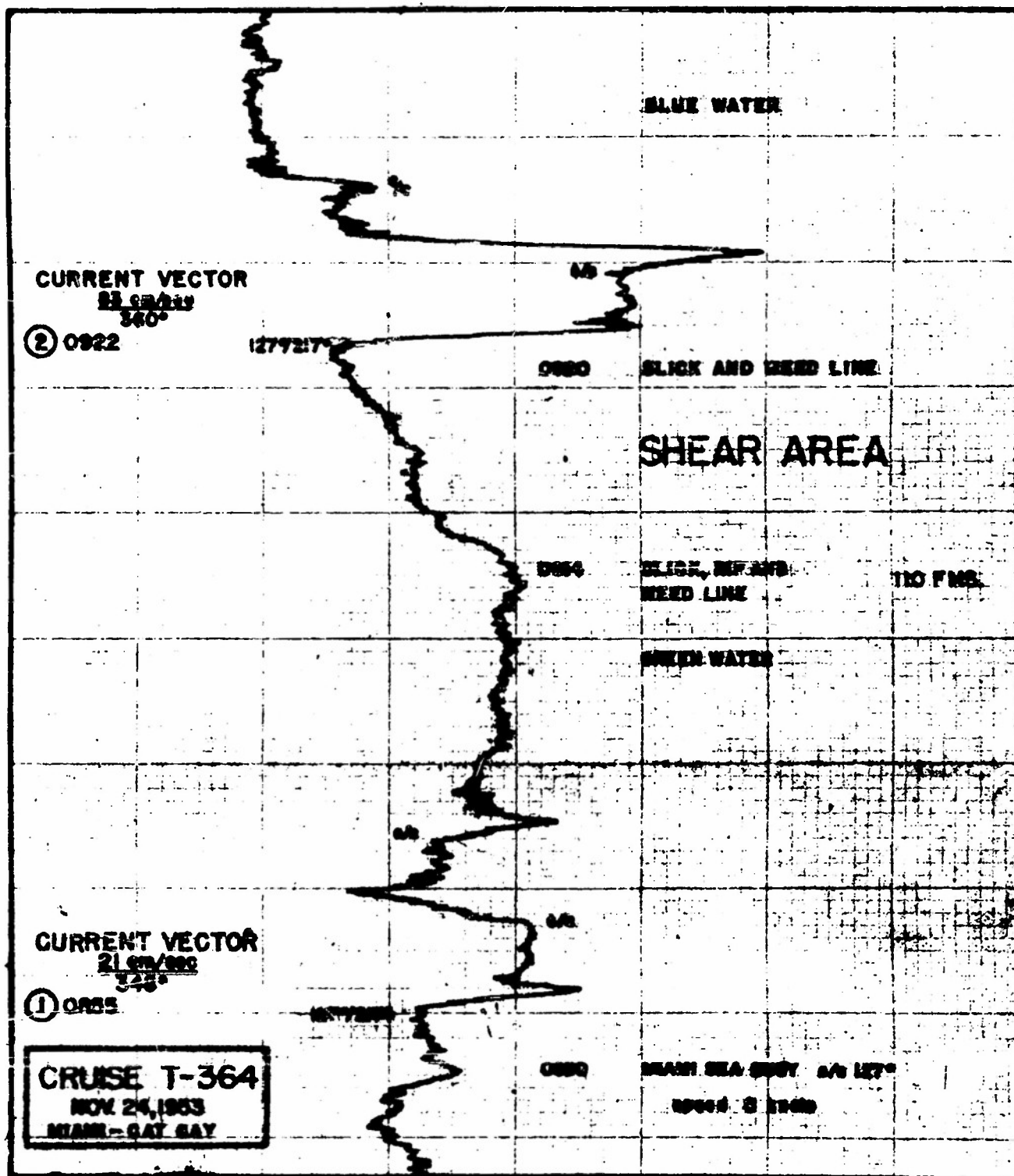


FIGURE D-32
SHEAR AREA AS SHOWN ON A GEK RECORD.

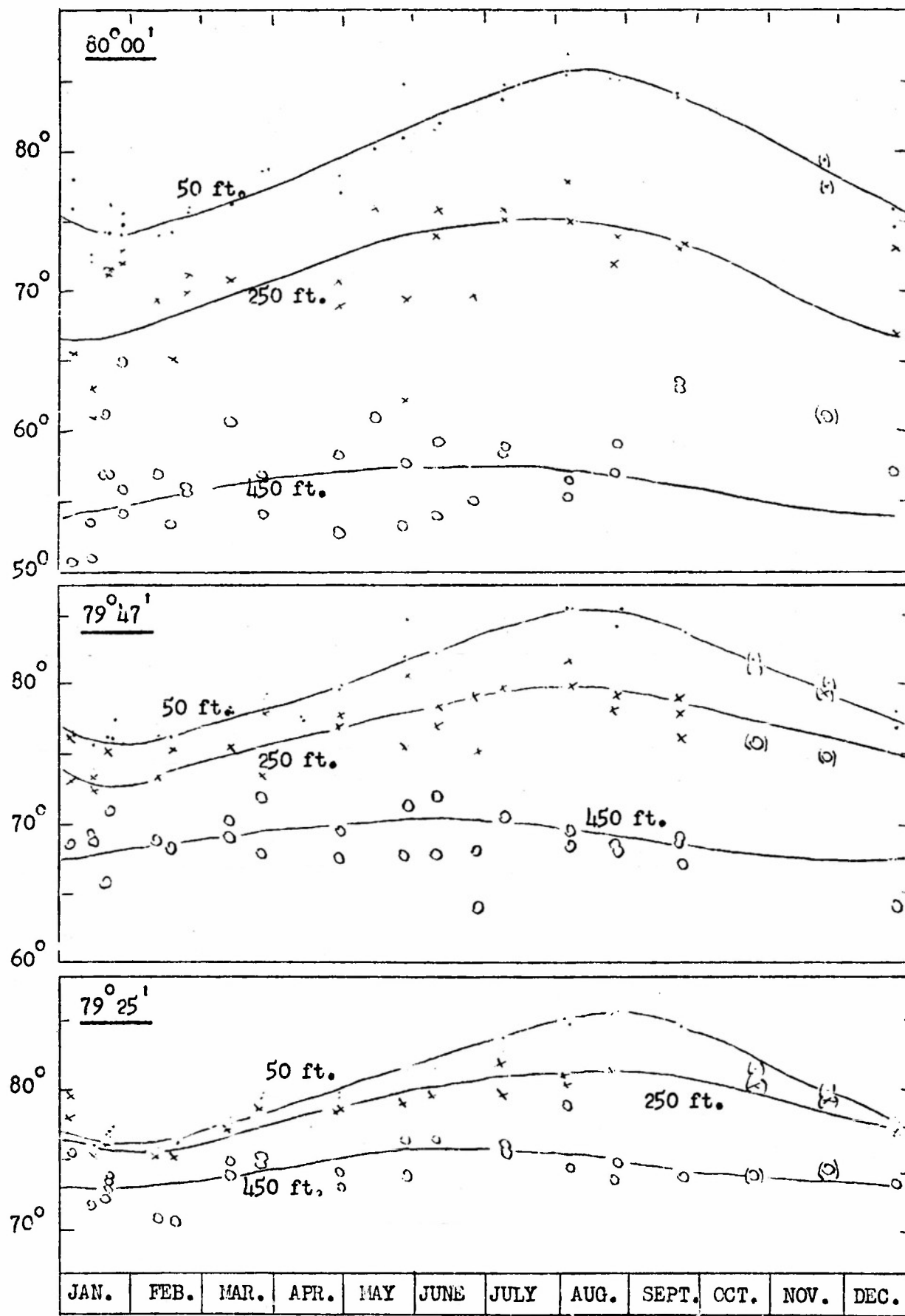


Fig. C-33 SEASONAL CYCLE OF TEMPERATURES

SECTION D

- (a) Pertinent information of the GEK fixes.
- (b) Data from Hydrographic Stations.

CRUISE	DATE	TIME LST	FIX NO.	LAT. N	LONG. W	SPEED cm/sec	DIRECTION true	N-COMP cm/sec	E-COMP cm/sec
T-240a	XII 22	0815	1	25 45.5	80 00.	63	340	59	-22
		0915	2	25 44	79 33	75	350	74	-13
		1015	3	25 43.5	79 48.5	106	004	106	7
		1115	4	25 42.9	79 43.5	128.5	007	127	16
		1215	5	25 42	79 37.6	105	008	104	15
		1315	6	25 41.2	79 31.1	84	006	82	9
		1415	7	25 40	79 24.6	51	026	46	22
		1515	8	25 39	79 21.4	30	074	8	29
T-240b	XII 23	0740	9	25 34.3	79 20	60	357	60	-3
		1115	10	25 41.1	79 33.5	107	012	105	22
		1215	11	25 41.4	79 40.7	144	357	144	-8
		1357	12	25 42.5	79 54	54	003	54	3
T-311	II 13	1015	1	25 32	76 31.5	20	101	- 4	20
		1115	2	25 36	76 25	55	007	55	7
		1215	3	25 40	76 18.5	55	064	24	50
		1315	4	25 43	76 12	33	082	5	33
		1415	5	25 47	76 05	64	096	- 7	63
		1515	6	25 50.5	75 59	61	089	1	61
		1615	7	25 54	75 52.5	65	103	-15	63
		1718	8	25 58	75 46	48	068	18	45
		1816	9	26 01.5	75 39	28	064	12	25
		1915	10	26 05	75 32.5	20	037	16	20
	II 14	2016	11	26 09	75 26.5	7	039	5	4
		2116	12	26 12.5	75 20	8	352	8	- 1
		2216	13	26 16	75 13	12	051	8	9
		2316	14	26 20	75 07	43	132	-29	32
		0018	15	26 22	75 03	64	159	-60	23
		0115	16	26 25.5	74 56.5	13	101	- 2	13
		0215	17	26 29	74 51	26	342	25	- 8
		0315	18	26 33	74 44	53	316	38	-37
		0415	19	26 36.5	74 38	30	321	23	-19
		0517	20	26 40	74 31.5	15	002	15	1
	II 15	0617	21	26 43.5	74 25	19	036	15	11
		0717	22	26 47	74 18.5	22	038	17	14
		0815	23	26 50.5	74 12.5	27	048	18	20
		1215	24	26 49	74 16	31	038	24	19
		1330	25	26 47	74 21	22	013	21	5
		1630	26	26 38	74 42	35	311	23	-26
		1737	27	26 35	74 49.5	38	290	13	-36
		2230	28	26 30	75 01	40	259	- 8	-39
		2330	29	26 27	75 08	16	257	- 4	-16
		0030	30	26 24	75 15	11	145	- 9	6
	II 17	0130	31	26 21.5	75 21	20	018	19	6
		0230	32	26 18.5	75 27	34	001	34	1
		0330	33	26 16	75 33	51	332	45	-24
		0430	34	26 13.5	75 39	34	349	33	- 6
		0630	35	26 08	75 51	33	045	23	23
		0930	36	26 08	75 51	27	098	- 4	27
		1030	37	26 06	75 57	25	094	- 2	25
		0408	38	25 49	79 19	64	015	62	17
		0448	39	25 47.8	79 22.1	27	348	26	- 6
		0515	40	25 46.2	79 25.6	31	005	31	3
		0620	41	25 44.9	79 32.3	68	010	67	12
		0715	42	25 45	79 40	102	002	102	4
		0815	43	25 46.7	79 47.1	124	018	118	38

CRUISE	DATE	TIME EST	FIX NO.	LAT. N	LONG W	SPEED cm/sec	DIRECTION true	N-COMP cm/sec	E-COMP cm/sec
T-312	II 24	0915	44	25 48.1	79 53.6	90	015	87	23
		1015	45	25 49	79 59.7	119	016	114	43
		1045	46	25 49	80 03	121	012	118	25
		1107	47	25 49.2	80 05	103	312	69	-76
		1118	48	25 49.3	80 05.4	21	345	20	-5
		0933	1	25	80 03	162	360	162	0
		0950	2	25	80 01.3	145	356	145	-10
		1015	3	25	79 59	154	360	154	0
		1149	4	25 53	79 59.1	151	007	150	18
		1207	5	25 53.9	79 59.1	151	006	150	16
		1240	6	25 56.8	80 02	160	001	160	3
T-313	II 27	1412	7	25 57.9	80 01.5	164	007	163	20
		1515	8	25 54.2	80 06	55	012	54	11
		1645	9	25 46	80 05.1	92	002	92	4
		1654	10	25 46	80 05.1	86	347	84	-19
		1715	11	25 46	80 05.1	82	357	82	-4
		1615	1	25 42.5	79 23	24	036	20	14
		1723	2	25 42	79 31.5	82	029	72	40
		1815	3	25 43	79 40	107	018	102	33
		1915	4	25 44.8	79 48.3	162	018	154	50
		2015	5	25 48.8	79 56.8	119	018	113	37
		2115	6	25 49.5	80 05	14	049	9	11
T-315a	III 12	0911	1	25 46.2	80 04	90	346	87	-22
		1015	2	25 45.6	79 57.6	164	346	159	-40
		1108	3	25 46	79 51.2	150	348	147	-31
		1218	4	25 45.8	79 44.8	156	004	156	11
		1315	5	25 44.7	79 37.6	111	008	110	15
		1415	6	25 43	79 32.5	77	007	76	9
		1515	7	25 41.2	79 26.7	61	004	61	4
		1615	8	25 39.5	79 21.8	28	028	25	13
		1939	9	25 36	79 22.5	8	076	2	8
		2015	10	25 36.7	79 27.7	34	058	18	29
		2115	11	25 38.5	79 35.7	67	024	61	27
T-315b	III 13	2215	12	25 40.8	79 43.2	108	018	103	33
		2315	13	25 43.3	79 50.4	161	011	158	31
		0105	14	25 47.8	79 53.2	146	005	145	13
		0215	15	25 48.2	80 00.8	107	345	103	-28
		0240	16	25 48.2	80 04.2	70	339	65	-25
		0954	1	25 46.2	80 04.6	43	351	42	-7
		1012	2	25 46.1	80 03.8	39	344	37	-11
		1108	3	25 48.2	80 03.9	68	350	67	-12
		1120	4	25 48.4	80 03.9	59	348	58	-12
		1305	5	25 49.7	80 03.9	76	349	75	-14
		1322	6	25 50.1	80 03.7	106	353	105	-13
T-320a	III 26	1518	7	25 52.3	80 02.8	137	353	136	-17
		1018	1	25 45.8	80 04.5	50	354	50	-5
		1115	2	25 42.7	79 57.5	62	349	61	-12
		1215	3	25 41.8	79 49.8	105	011	103	20
		1315	4	25 43.4	79 39	146	014	142	35
		1423	5	25 42.7	79 34.5	93	014	90	23
		1928	6	25 34.3	79 20.3	57	168	-56	6
		2018	7	25 32.5	79 27.3	9	160	-8	3
		2115	8	25 32.8	79 34.2	51	031	44	26
		2215	9	25 35.4	79 40.5	100	030	87	50
		2315	10	25 39.2	79 46.2	153	016	147	56
T 320 b									

CRUISE	DATE	TIME EST	FIX NO.	LAT N	LONG W	SPEED cm/sec	DIRECTION true	N-COMP cm/sec	E-COMP cm/sec
	III 27	0015	11	25 42.8	79 51.8	125	031	107	64
		0115	12	25 44.3	79 58.8	97	017	93	28
		0150	13	25 43.8	80 03.4	18	008	18	3
T-323a	IV 28	0902	1	25 45.8	80 04.7	91	350	90	-16
		0935	2	25 44.5	80 02	113	349	111	-22
		1014	3	25 43.2	79 56	147	354	146	-15
		1111	4	25 42.4	79 49.5	160	001	160	3
		1215	5	25 42.7	79 43	155	000	155	0
		1315	6	25 42.7	79 36.5	102	356	102	-7
		1415	7	25 41	79 30.6	77	345	74	-20
		1515	8	25 38.2	79 24.4	83	337	76	-32
		1545	9	25 37	79 21.5	47	351	46	-7
T-323b	IV 29	1120	10	25 36	79 27.5	48	021	45	17
		1215	11	25 37	79 35.6	104	350	102	-18
		1315	12	25 39.4	79 43.6	132	001	132	2
		1413	13	25 42.6	79 51.2	152	000	152	0
*** T-324 (below)		1515	14	25 45.3	79 59	126	346	122	-30
		1545	15	25 46.4	80 04	113	359	113	-2
T-325	V 12	1100	1	25 44.7	80 02	86	037	69	52
		1145	2	25 44.2	79 58.7	137	359	137	-2
		1215	3	25 44.5	79 56	142	360	142	0
		1245	4	25 44.5	79 53	133	005	132	12
T-331	V 26	0900	1	25 45.5	80 04.7	116	350	114	-20
		0917	2	25 45.5	79 02.6	133	354	132	-13
		1016	3	25 44.3	79 56	192	353	191	-23
		1115	4	25 44.5	79 49	243	353	241	-30
		1218	5	25 45.5	79 43.7	214	351	212	-34
		1317	6	25 45.6	79 36.5	138	214	-114	-77
		1416	7	25 44	79 30.2	113	343	108	-33
		1516	8	25 41.9	79 24	58	313	40	-42
		1559	9	25 41.4	79 21	83	359	83	-1
T-339a	VI 25	1052	1	25 45.9	80 05.4	35	001	35	1
		1115	2	25 43.5	80 01	25	334	22	-11
		1215	3	25 42.5	79 54	98	355	98	-9
		1315	4	25 42.6	79 48.1	119	004	119	8
		1415	5	25 43.4	79 41.6	121	007	120	15
		1515	6	25 43.4	79 35	82	359	82	-1
		1615	7	25 40.8	79 29	70	358	70	-2
		1715	8	25 38.0	79 23.5	49	014	48	12
		1735	9	25 36.7	79 21.1	39	353	39	-1
T-339 b	VI 26	0703	10	25 32.5	79 29.6	43	027	38	20
		0915	11	25 35.8	79 37.2	88	030	76	44
		1015	12	25 38.8	79 43.4	146	021	136	52
		1115	13	25 43	79 49.2	146	012	143	30
		1150	14	25 44.7	79 53.2	88	349	86	-17
		1350	15	25 51.5	79 57.2	31	344	30	-9
		1427	16	25 52	80 02.7	7	219	-5	-4
T-347	VII 21	0100	1	24 46	80 38	54	075	14	52
		0200	2	24 40	80 37	127	066	52	116
		0300	3	24 34.5	80 35.7	123	058	65	104
		0400	4	24 28.3	80 34	85	056	48	71
		0500	5	24 22.8	80 31.5	78	045	55	55
		0600	6	24 17	80 29.7	82	044	59	57
		0700	7	24 11	80 29	75	059	39	64

CRUISE	DATE	TIME EST	FIX NO.	LAT N	LONG W	SPEED cm/sec	DIRECTION true	N-COMP cm/sec	E-COMP cm/sec
		0800	8	24 05	80 28	51	052	31	40
		0900	9	23 59.3	80 27.5	32	073	9	31
		2030	10	23 38.5	80 24.5	33	301	17	-28
		2130	11	23 32	80 23.5	57	336	52	-27
		2230	12	23 25	80 22.5	26	028	23	12
		2330	13	23 18.5	80 21.5	35	015	34	9
T-347 VII	22	1235	15	23 47	79 26	30	182	-30	-1
		1406	16	23 51.7	79 20.5	29	099	-5	29
		1500	17	23 56	79 15.5	21	016	20	6
		1600	18	24 01	79 10.2	56	354	56	-6
	VII 23	0323	19	25 14.5	79 12.5	21	182	-21	-1
		0400	20	25 15	79 16.8	29	195	-23	-8
		0500	21	25 17	79 24.5	27	127	-10	22
		0600	22	25 19.5	79 32.8	33	089	0	33
		0700	23	25 22.5	79 40.3	59	051	37	46
		0800	24	25 26	79 47.6	100	017	96	29
		0900	25	25 30.8	79 54	175	014	170	42
		1000	26	25 36	79 59.7	100	012	98	21
		1045	27	25 39.5	80 03	47	336	13	-19
T-349a VIII	4	1125	1	25 44.8	80 01.7	88	354	88	-9
		1215	2	25 44.8	79 56.2	102	351	101	-16
		1315	3	25 46.7	79 49.5	109	356	109	-8
		1415	4	25 46.6	79 42.6	87	002	87	3
		1515	5	25 44.8	79 35.8	73	009	72	12
		1615	6	25 41.5	79 29.5	62	005	62	5
		1713	7	25 38.5	79 23.6	45	002	45	2
		1748	8	25 36.7	79 21	19	282	4	-19
T-349b VIII	5	0605	9	25 34.5	79 20.5	56	007	56	7
		0700	10	25 33	79 24.5	60	004	60	4
		0737	11	25 32.5	79 29	67	020	63	23
		0930	12	25 34	79 33.6	80	009	79	13
		1030	13	25 38.8	79 42	106	010	104	18
		1130	14	25 38.2	79 50	102	004	102	7
		1300	15	25 45	79 57	124	002	124	5
		1338	16	25 46.2	80 01	30	025	27	13
T-352a VIII	24	0927	1	25 45.5	80 04.6	54	344	52	-15
		1015	2	25 43.3	79 59.4	76	359	76	-1
		1110	3	25 42.2	79 52.4	87	005	97	8
	VIII 24	1215	4	25 42.6	79 45.9	130	004	130	9
		1315	5	25 42.3	79 39.1	121	000	121	0
		1415	6	25 40.3	79 31.8	88	001	88	1
		1515	7	25 37.1	79 24.6	66	009	65	11
		1558	8	25 35.6	79 20.6	24	006	24	3
T-352b VIII	25	0515	9	25 32	79 24.8	41	025	37	17
		0615	10	25 30	79 32.6	72	021	67	26
		0815	11	25 32.5	79 35.7	76	017	73	22
		0915	12	25 33.5	79 43	91	024	83	37
		1015	13	25 36	79 50.5	126	002	126	5
		1215	14	25 42	79 59	87	358	87	-3
		1257	15	25 42	80 03	34	346	33	-8
T-353b IX	22	0715	1	25 34	79 25.6	70	356	70	-5
		0815	2	25 34.4	79 33	82	002	82	3
		0915	3	25 36.5	79 41.2	112	356	112	-8

CRUISE	DATE	TIME EST	FIX NO.	LAT N	LONG W	SPEED cm/sec	DIRECTION true	N-COMP cm/sec	E-COMP cm/sec
		1015	4	25 39.7	79 48.8	154	352	153	-21
		1115	5	25 41.8	79 56.6	91	338	84	-34
		1212	6	25 42.6	80 04.7	96	350	95	-16
T-355	X 2	0853	1	25 46.2	80 04.9	34	302	18	-29
		0916	2	25 46.3	80 03.8	17	328	14	-9
		0940	3	25 46.3	80 01.8	31	331	27	-15
		1024	4	25 46.4	80 03.8	24	308	15	-19
		1036	5	25 46.7	80 05	45	313	31	-33
		1203	6	25 46.5	80 04.9	32	322	25	-20
		1216	7	25 46.5	80 04.3	32	322	25	-20
		1240	8	25 46.6	80 02.2	20	325	16	-11
		1301	9	25 47	80 00.6	69	341	65	-22
		1329	10	25 47.2	80 02.3	31	337	29	-12
		1352	11	25 47.4	80 05	37	310	24	-28
T-358a	X 23	0835	1	25 45	80 04.2	30	186	-30	-3
		0915	2	25 42.5	79 58.8	36	346	35	-9
		1010	3	25 39	79 52.1	34	006	34	4
		1200	4	25 37	79 46.1	60	355	60	-5
		1415	5	25 35	79 37.2	33	354	33	-3
		1643	6	25 31.4	79 27.2	35	224	-25	-24
		1834	7	25 31.4	79 27.5	33	066	13	30
T-358b	X 24	0630	8	25 34.4	79 20.2	26	355	26	-2
		0715	9	25 35	79 26.5	54	344	52	-15
		0755	10	25 35.3	79 32.6	15	290	5	-14
		0915	11	25 36.8	79 43.7	75	338	70	-28
		1015	12	25 39	79 52	85	345	82	-22
		1115	13	25 40	80 00.4	30	341	28	-10
		1150	14	25 40	80 05	55	179	-55	1
T-362	XI 10	1257	1	25 40	79 58	20	008	20	3
		1555	2	25 40	79 58	32	001	32	1
		1612	3	25 40	79 58	30	354	30	-3
		1948	4	25 40	79 56	67	028	59	31
	XI 11	0012	5	25 41	79 59	25	180	-25	0
		0112	6	25 44	80 03	34	108	-11	32
T-364a	XI 24	0855	1	25 45.5	80 04.5	21	348	21	-4
		0922	2	25 44.3	80 02.3	83	000	83	0
		1000	3	25 43	79 57.2	110	018	104	34
		1221	4	25 40.6	79 45.7	126	016	121	35
		1437	5	25 43	79 38.5	103	024	94	42
		1628	6	25 40.2	79 26.6	39	037	31	23
T-364b		1945	8	25 34.5	79 24.7	26	356	26	-2
		2030	9	25 34.5	79 30.6	60	000	60	0
		2115	10	25 35	79 36.5	67	007	66	6
		2200	11	25 36.6	79 42.2	99	005	98	9
		2245	12	25 39.8	79 48	110	011	108	21
		2330	13	25 42.7	79 53.6	99	009	98	15
	XI 25	0015	14	25 44.2	79 59.2	95	006	94	10
		0100	15	25 45	80 05	85	005	84	5
**									
T-324	V 7	2315	1	26 36.7	79 58.5	222	011	218	43
	8	0020	2	22 40.5	79 50.5	187	015	182	48
		0115	3	26 42.3	79 42.5	171	008	169	24
		0215	4	26 43.4	79 34.7	140	011	137	27

CRUISE	DATE	TIME	FIX	LAT.	LONG.	SPEED	direction	N-COMP	E-COMP
		EST	NO.	N	W	cm/sec	true	cm/sec	cm/sec
T-324	V 8	0315	5	26 43.4	79 26	108	005	107	9
		0415	6	26 43	79 18.3	66	008	65	10
		0515	7	26 41.9	79 10	44	007	43	4
		0615	8	26 39.6	79 02	20	084	22	20
		0645	9	26 38.5	78 58.8	48	123	-27	41

Cruise T-240 Station T 1 Lat. 25° 39.5' N. Long. 79° 26.5' W.
 Date 23 XII 52 Local time 0950 Time Zone +5
 Depth 768 m. Max. sample depth 746 m. Wire angle 15°
 Weather 01 Clouds AC 3/8 Wind 300° 3 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp °C	Sal. ‰	σ_t	$\frac{5}{10}$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	25.52	36.14	24.06	0	25.52	36.14	24.06	387.5		.0000
9	25.52	36.13	24.05	10	25.52	36.13	24.05	387.8	.0388	.0388
47	25.29	36.17	24.17	20	25.46	36.13	24.08	385.4	.0387	.0775
93	25.13	36.18	24.23	30	25.34	36.13	24.12	382.0	.0384	.1159
184	20.27	36.55	25.90	50	25.23	36.13	24.18	377.2	.0759	.1918
364	14.80	35.86	26.71	75	25.21	36.15	24.20	376.2	.0942	.2860
546	10.61	35.23	27.04	100	25.00	36.21	24.28	369.6	.0932	.3792
746	6.36	34.83	27.41	150	21.75	36.56	25.48	257.1	.1566	.5358
				200	19.68	36.51	26.01	208.3	.1163	.6521
				250	18.00	36.33	26.31	181.1	.0973	.7494
				300	16.46	36.13	26.62	152.8	.0834	.8328
				400	13.98	35.70	26.75	142.4	.1476	.9804
				500	11.70	35.31	26.91	128.0	.1352	1.156
				600	9.37	35.08	27.15	105.1	.1165	1.2321
				700	7.22	34.89	27.32	87.9	.0965	1.3286
				800	(5.50)	(34.80)	27.61	59.3	.0736	1.4022

Cruise T-240 Station T 2 Lat. 25° 42.5' N. Long. 79° 55.2' W.
 Date 23 XII 52 Local time 1420 Time Zone +5
 Depth 355 m. Max. sample depth 350 m. Wire angle 10°
 Weather 02 Clouds Ci 4/8 Wind 300° 1 Sea 2 Swell 0
 Ac 4

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ_{θ}	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	23.88	36.21	24.60	0	23.88	36.21	24.60	335.1		.0000
10	23.78	36.19	24.62	10	23.78	36.19	24.62	333.6	.0334	.0334
50	23.20	36.09	24.72	20	23.75	36.14	24.60	335.8	.0335	.0669
100	18.50	35.94	25.89	30	23.50	36.09	24.63	333.3	.0669	.1338
150	11.64	35.48	27.05	50	23.20	36.09	24.72	325.6	.0659	.1997
200	10.50	35.26	27.08	75	22.85	36.12	24.84	315.1	.0801	.2798
250	9.59	35.11	27.12	100	18.50	35.94	25.89	215.7	.0663	.3461
350	8.29	34.97	27.23	150	11.64	35.48	27.05	106.0	.0804	.4265
				200	10.50	35.26	27.08	103.9	.0524	.4789
				250	9.59	35.11	27.12	100.8	.0511	.5300
				300	8.90	35.00	27.15	98.7	.0498	.5798

Cruise T 315 Station T 3 Lat. $25^{\circ} 33.5'$ N. Long. $79^{\circ} 22.5'$ W.
 Date 12 III 53 Local time 1745 Time Zone +5
 Depth 713 m. Max. sample depth 576 m. Wire angle 5°
 Weather 02 Clouds Ci 6/8 Wind 180° 2 Sea 2 Swell 7sec. S.

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp $^{\circ}$ C	Sal. ‰	σ_t	Depth m	Temp $^{\circ}$ C	Sal. ‰	σ_t	$10^5 \sigma_{\theta}$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	27.20	36.04	23.46	0	27.20	36.04	23.46	443.6		.0000
38	27.10	36.05	23.49	10	27.16	36.04	23.48	442.3	.0443	.0443
75	25.70	36.12	23.99	20	27.15	36.04	23.49	441.8	.0442	.0885
145	24.73	36.40	24.50	30	27.05	36.05	23.53	434.2	.0438	.1323
282	18.00	36.49	26.44	50	26.76	36.07	23.63	429.7	.0864	.2187
422	12.96	35.78	27.03	75	25.70	36.12	23.99	396.3	.1032	.3219
576	7.95	34.97	27.28	100	25.45	36.19	24.12	384.9	.0976	.4195
				150	24.44	36.37	24.57	344.1	.1822	.6017
				200	21.63	36.65	25.60	247.7	.1479	.7496
				250	19.26	36.61	26.20	192.0	.1099	.8595
				300	17.34	36.40	26.52	162.7	.0886	.9481
				400	13.68	35.89	26.95	122.1	.1424	1.0905
				500	10.32	35.37	27.12	107.7	.1149	1.2054
				600	(7.31)	(34.89)	27.31	87.5	.0976	1.3030

Cruise T 315 Station T 4 Lat. 25° 43' N. Long. 79° 50.2' W.
 Date 12 III 53 Local time 2345 Time Zone +5
 Depth 549 m. Max. sample depth 353 m. Wire angle 40°
 Weather 01 Clouds Cu 3/8 Wind 150 4 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp °C	Sal. ‰	σ_t	Depth m	Temp °C	Sal. ‰	σ_t	$10^5 \sigma_\theta$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	25.79	36.05	23.92	0	25.79	36.05	23.92	399.9		.0000
19	25.93	36.17?	23.97?	10	25.79	36.04	23.91	401.2	.0400	.0400
32	25.78	36.03	23.90	20	25.93	36.03	23.85	407.4	.0404	.0804
133	21.34	36.38	25.47	30	25.79	36.03	23.90	403.0	.0405	.1209
220	15.72?	36.10	26.67?	50	25.78	36.04	23.92	402.0	.0805	.2014
284		35.72		75	24.68	36.29	24.43	354.3	.0945	.2959
353	9.66	35.39	27.33	100	22.51	36.40	25.16	285.6	.0800	.3759
				150	20.67	36.33	25.61	244.5	.1325	.5084
				200	15.61	36.18	26.76	136.0	.0951	.6035
				250	13.52	35.94	27.03	111.3	.0618	.6653
				300	11.59	35.62	27.15	100.3	.1058	.7711
				400	(7.98)	(35.00)	27.30	85.7	.0930	.8641

Cruise T 334 Station T 5 Lat. 25° 32.2' N. Long. 79° 33.5' W.
 Date 10 VI 53 Local time 0730 Time Zone +5
 Depth 805 m. Max. sample depth 200 m. Wire angle 0°
 Weather 01 Clouds Ac 2/8 Wind 090 1 Sea 1 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp °C	Sal. ‰	σ_t	Depth m	Temp °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	27.25	35.85	23.30	0	27.25	35.85	23.30	458.9		.0000
20	27.25	35.87	23.31	10	27.25	35.86	23.31	458.6	.0459	.0459
30	27.12	35.98	23.44	20	27.25	35.87	23.31	458.5	.0459	.0918
40	26.49	36.02	23.68	30	27.12	35.98	23.44	446.7	.0453	.1371
50	26.22	36.10	23.82	50	26.22	36.10	23.82	411.7	.0858	.2229
60	26.17	36.08	23.82	75	26.03	36.15	23.91	403.4	.1019	.3248
100	24.94	36.24	24.31	100	24.94	36.14	24.31	365.9	.0962	.4210
200	20.44	36.67	25.94	150	22.55	36.62	25.31	273.1	.1598	.5808
				200	20.44	36.67	25.93	215.4	.1221	.7029
				250	(18.44)	(36.53)	26.35	177.2	.0982	.8011

Cruise T 334 Station T 6 Lat. 25° 36' N. Long. 79° 55' W.
 Date 10 VI 53 Local time 1100 Time Zone +5
 Depth 439 m. Max. sample depth 230 Wire angle 35°
 Weather 02 Clouds Cu 6/8 Wind 130° 1 Sea 1 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	28.05	36.12	23.24	0	28.05	36.12	23.25	463.9		.0000
20	27.67	36.09	23.35	10	28.05	36.10	23.23	466.2	.0465	.0465
26	27.57	36.09	23.38	20	27.67	36.09	23.35	455.1	.0461	.0926
33	26.85	36.17	23.67	30	27.24	36.11	23.49	422.2	.0449	.1375
39	25.76	36.21	24.04	50	25.75	36.27	24.09	385.7	.0826	.2201
52	25.72	36.27	24.10	75	24.00	36.32	24.66	336.3	.0897	.3098
64	25.18	36.23	24.25	100	20.58	36.30	25.61	242.7	.0719	.3817
123	18.28	36.24	26.18	150	16.65	36.11	26.47	162.2	.1012	.4829
230	12.30	35.55	26.99	200	13.80	35.78	26.85	126.8	.0722	.5551
				250	(11.28)	(35.39)	27.05	108.5	.0589	.6140

Cruise T 339 Station T 7 Lat. 25° 32.2' N. Long. 79° 29.5' W.
 Date 26 VI 53 Local time 0725 Time Zone +5
 Depth 823 m. Max. sample depth 364 m. Wire angle 5°
 Weather 03 Clouds Cu 8/8 Wind 170° 2 Sea 2 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	28.6 ⁸	35.91	22.90	0	28.60	35.91	22.90	497.0		.0000
30	28.29	36.00	23.07	10	28.50	35.95	22.96	491.4	.0494	.0494
40	28.18	36.00	23.11	20	28.36	35.98	23.03	485.7	.0488	.0982
49	27.85	36.00	23.22	30	28.29	36.00	23.07	482.3	.0484	.1466
59	27.38	36.00	23.37	50	27.85	36.00	23.22	469.0	.0951	.2417
78	26.84	36.06	23.59	75	27.00	36.05	23.54	439.3	.1135	.3552
97		36.36		100	25.20	36.41	24.36	362.0	.1001	.4553
191	20.82?	36.65	25.82?	150	23.00	36.63	25.19	284.8	.1617	.6170
364	14.05	35.78	26.80	200	22.25	36.63	25.40	266.7	.1378	.6170
				250	18.04	36.43	26.38	174.6	.1103	.2548
				300	16.31	36.16	26.58	156.6	.0828	.8651
				400	(13.00)	(35.60)	26.88	129.2	.1429	.9479
										1.0908

Cruise T 344 Station T 8 Lat. 25° 43.8' N. Long 79° 59.8' W.
 Date 7 VII. 53 Local time 1030 Time Zone +5
 Depth 292 m. Max. sample depth 290 m. Wire angle 30°
 Weather 01 Clouds Cu 2/8 Wind 120° 1 Sea 1 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal ‰	σ_t	Depth m	Temp. °C	Sal ‰	σ_t	10 ⁵ σ	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	28.61	36.09	23.03	0	28.61	36.09	23.03	484.9		.0000
17	28.41	36.06	23.08	10	28.51	36.07	23.05	483.4	.0484	.0484
24	28.31	36.07	23.11							
33	28.08	36.07	23.19	20	28.36	36.07	23.10	479.0	.0481	.0965
51	27.32	36.10	23.47	30	28.17	36.07	23.16	473.7	.0476	.1441
114	21.14	36.60	25.69	50	27.36	36.10	23.45	446.9	.0921	.2362
290	7.11	35.06	27.47	75	25.52	36.27	24.16	380.1	.1034	.3396
				100	22.90	36.58	25.18	283.7	.0830	.4226
				150	16.33	36.34	26.72	138.4	.1055	.5281
				200	12.78	35.67	26.97	115.1	.0633	.5914
				250	9.64	35.31	27.17	96.3	.0528	.6442

Cruise T 344 Station T 9 Lat. 25° 48.3' N. Long. 79° 43.1' W.
 Date 7 VII 53 Local time 1300 Time Zone
 Depth 786 m. Max. sample depth 362 m. Wire angle 20°
 Weather 01 Clouds Ci Wind 120° 2 Sea 2 Swell 0
 Cu 3/8

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ_t	ΔD dyn.m.	$\Sigma \Delta D$ dyn. m.
1	28.9 ^E	36.08	22.93	0	28.95	36.08	22.91	496.0		.0000
21	28.54			10	28.95	36.08	22.91	496.4	.0496	.0496
30	28.10	36.05	23.17	20	28.60	36.07	23.02	486.7	.0491	.0987
38	27.51	36.00	23.33	30	28.10	36.05	23.17	472.8	.0480	.1467
47	27.21	36.18	23.56	50	27.20	36.01	23.47	445.0	.0918	.2385
55	27.13	36.05?	23.49?	75	26.19	36.43	24.07	388.8	.1042	.3427
63	26.57	36.26	23.82	100	24.50	36.64	24.76	323.8	.0891	.4318
125	22.43	36.79	25.47	150	20.48	36.75	25.98	209.5	.1333	.5651
362	9.61	35.23	27.22	200	16.39	36.28	26.65	146.8	.0890	.6541
				250	14.34	35.92	26.84	129.5	.0690	.7231
				300	12.04	35.61	27.07	108.0	.0593	.7824
				400	(8.00)	(35.02)	27.31	84.8	.0964	.8788

Cruise T 344 Station T 10 Lat. 25° 48.3' N. Long. 79° 31.8' W.
 Date 7 VII 53 Local time 1500 Time Zone + 5
 Depth 823 m. Max. sample depth 393 m. Wire angle 5°
 Weather 01 Clouds Cu 2/8 Wind 090° 1 Sea 1 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ δ	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	29.50 ^B	36.22	22.82	0	29.50	36.22	22.82	504.0		.0000
25	28.42	36.05	23.07	10	28.96	36.13	22.95	492.4	.0498	.0498
34	28.17	36.03	23.13	20	28.54	36.07	23.04	484.8	.0489	.0987
44	27.50	36.06	23.38	30	28.22	36.03	23.12	477.4	.0481	.0987
54	27.36	36.08	23.45	50	27.39	36.07	23.42	449.0	.0926	.1468
63	26.96	36.08	23.57	75	26.50	36.03	23.71	422.0	.1089	.2394
73	26.64	36.08	23.67	100	25.22	36.58	24.33	364.0	.0982	.3483
143	22.76	36.74	25.34	150	22.33	36.74	25.46	259.1	.0779	.3965
393	13.15	35.76	36.93	200	19.86	36.69	26.10	199.9	.0779	.4744
				250	17.87	36.51	26.47	166.0	.1147	.5891
				300	16.13	36.24	26.68	146.8	.0914	.6805
				400	(12.91)	(35.72)	26.98	119.8	.0782	.7587
									.1333	.8920

Cruise T 349 Station T 11 Lat. $25^{\circ} 32.5' N.$ Long. $79^{\circ} 29' W.$
 Date 5 VIII 53 Local time 0800 Time Zone +5
 Depth 730 m. Max. sample depth 400 m. Wire angle 0°
 Weather 03 Cu Clouds Ci 7/8 Wind 230 1 Sea 1 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. $^{\circ}C$	Sal. ‰	σ_t	Depth m	Temp. $^{\circ}C$	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn. m.	$\Sigma \Delta D$ dyn. m.
1	29.1 ^B	35.99	22.79?	0	28.75	35.99	22.91	496.0		.0000
30	28.45	35.90	22.95	10	28.65	35.96	22.92	495.4	.0496	.0496
40	28.40	35.91	22.96	20	28.60	35.92	22.91	496.8	.0496	.0992
50	28.24	35.99	23.08	30	28.45	35.90	22.95	493.2	.0495	.1487
60	27.81	36.02	23.25	50	28.24	35.99	23.08	482.3	.0975	.2462
100	25.87	36.19	24.00	75	27.14	36.08	23.51	442.1	.1155	.3617
200	19.72	36.62	26.10	100	25.87	36.19	24.00	396.4	.1048	.4665
300	18.15	36.56	26.46	150	22.25	46.51	25.31	273.2	.1674	.6339
400	16.96	36.16	26.44	200	19.72	36.63	26.10	199.8	.1182	.7521
				250	18.90	36.64	26.32	180.6	.0951	.8472
				300	18.15	36.56	26.46	168.7	.0873	.9345
				400	16.96	36.16	26.44	173.5	.1711	1.1056

Cruise T 349 Station T 12 Lat. $28^{\circ} 38.2' N.$ Long. $79^{\circ} 50.2' W.$
 Date 5 VIII 53 Local time 1130 Time Zone +5
 Depth 550 m. Max. sample depth 342 m. Wire angle 25°
 Weather 02 Clouds Cs 7/8 Wind 0 Sea 0 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. $^{\circ}C$	Sal ‰	σ_t	Depth m	Temp. $^{\circ}C$	Sal ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	29.80 ^B	36.04	22.59	0	29.80	36.04	22.59	526.0		.0000
36	28.93	36.05	22.89	10	29.73	36.01	22.60	525.4	.0526	.0526
45		36.13		20	29.60	36.01	22.63	528.8	.0527	.1053
54	27.91			30	29.20	36.03	22.79	509.2	.0519	.1572
72	26.08	36.21	23.95	50	28.14	36.09	23.18	472.8	.0982	.2554
134	19.67	36.52	26.02	75	25.80	36.23	24.05	390.6	.1079	.3633
252	12.42	35.55	26.96	100	23.80	36.41	24.78	321.9	.0890	.4523
342	6.65	34.99	27.50	150	18.61	36.47	26.26	182.5	.1261	.5784
				200	15.44	36.06	26.71	140.7	.0808	.6592
				250	12.70	35.56	26.91	122.1	.0657	.7249
				300	9.95	35.21	27.14	100.3	.0556	.7805
				400	(5.28)	(34.91)	27.59	56.1	.0782	.8587

Cruise T 352 Station T 13 Lat. 25° 36.5' N. Long. 79° 54' W.
 Date 25 VIII 53 Local time 1130 Time Zone +5
 Depth 430 m. Max. sample depth 303 m. Wire angle 35°
 Weather 01 Clouds Ci 2/10 Wind 170 3 Sea 2 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn. m.
1	29.70?	35.99	22.72?	0	29.50	35.99	22.64	522.0		.0000
33	28.28	36.00	23.04	10	29.50	35.99	22.64	522.4	.0522	.0522
50	27.24?	36.08	23.48?	20	29.40	35.99	22.63	518.8	.0520	.1042
67	26.09	36.22	23.95	30	29.00	36.00	22.83	504.3	.0511	.1553
83	24.14	36.26	24.58	50	27.50	36.08	23.40	451.7	.0956	.2509
160	16.69	36.18	26.52	75	26.00	36.25	23.99	396.3	.1060	.3569
234	13.72	35.78	26.87	100	23.62	36.27	24.74	325.7	.0925	.4494
303	8.97	35.04	27.17	150	18.09	36.21	26.20	188.1	.1284	.5778
				200	15.10	36.01	26.74	137.7	.0814	.6592
				250	12.71	35.61	26.94	119.4	.0642	.7234
				300	9.27	35.08	27.15	98.8	.0545	.7779

Cruise T 353 Station T 14 Lat. 25° 43.6' N. Long. 79° 56.6' W.
 Date 21 IX 53 Local time 1000 Time Zone +5
 Depth 320 m. Max. sample depth 269 Wire angle 30°
 Weather 50 Clouds Lt 8/10 Wind 170 2 Sea 2 Swell

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ	ΔD dyn. m.	$\Sigma \Delta D$ dyn. m.
1	29.05	35.17	22.19	0	29.05	35.17	22.19	564.3		.0000
42	27.27	36.25	23.59	10	29.05	35.69	22.57	527.4	.0545	.0545
84	22.39	26.44	25.22	20	28.95	35.95	22.81	505.9	.0516	.1061
132	19.41	36.34	25.96	30	28.45	36.12	23.11	478.2	.0492	.1553
180	16.20	36.08	26.55	50	26.34	36.30	23.97	400.9	.0879	.2432
205	15.38	36.00	26.67	75	23.33	36.42	24.93	306.1	.0884	.3316
230		35.49		100	20.88	36.44	25.64	239.6	.0682	.3998
269	7.55	35.05	27.40	150	17.42	36.23	26.37	171.3	.1027	.5025
				200	15.56	36.02	26.65	146.2	.0793	.5818
				250	9.10	35.23	27.30	83.3	.0573	.6391
				300	(5.65)	(34.82)	27.50	63.6	.0367	.6758

Cruise T 353 Station T 15 Lat. 25° 44.3' N. Long. 79° 46.5' W
 Date 21 IX 53 Local time 1230 Time Zone +5
 Depth 768 m. Max. sample depth 596 m. Wire angle 40+°
 Weather 03 Clouds Bs 8/10 Wind 200° 2 Sea 2 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ	ΔD dyn. m.	$\Sigma \Delta D$ dyn. m.
1	28.38	35.82	22.90	0	28.38	35.82	22.90	496.3		.0000
37	28.43	36.16	23.14	10	28.42	35.91	22.96	491.4	.0494	.0494
88	24.83	36.42	24.49	20	28.50	36.02	23.01	486.6	.0489	.0983
175		36.49		30	28.50	36.11	23.09	480.5	.0483	.1466
305	13.78	35.75	26.83	50	27.75	36.26	23.45	447.2	.0928	.2394
374	10.99	35.22	26.96	75	25.70	36.38	24.19	377.1	.1030	.3424
596	6.48	34.88	27.43	100	24.18	36.45	24.70	328.7	.0882	.4306
				150	21.54	36.50	25.50	254.5	.1458	.5764
				200	18.98	36.44	26.14	195.1	.1124	.6888
				250	16.50	36.21	26.57	154.8	.0874	.7762
				300	14.00	35.78	26.81	133.8	.0721	.8483
				400	10.32	35.15	27.03	112.3	.1230	.9713
				500	8.70	34.99	27.18	99.5	.1059	1.0772
				600	6.47	34.88	27.42	76.0	.0877	1.1649

Cruise T353 Station T 16 Lat. 25° 43.6' N. Long. 79° 31' W.
 Date 21 IX 53 Local time 1600 Time Zone +5
 Depth 750 m. Max. sample depth 532 m. Wire angle 40+°
 Weather 50 Clouds St 4/10 Wind 170 4 Sea 4 Swell 0

OBSERVED VALUES				VALUE AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn. m.	$\Sigma \Delta D$ dyn. m.
1	28.7 ²	35.82	22.79	0	28.70	35.82	22.79	506.4		.0000
38	28.68	36.32	23.18	10	28.73	35.97	22.90	497.0	.0502	.0502
76	26.33	36.19	23.85	20	28.74	36.14	23.02	485.5	.0491	.0993
142		36.56		30	28.74	36.26	23.11	477.5	.0481	.1494
228	19.43	36.63	26.17	50	28.25	36.30	23.31	459.9	.0937	.2411
304	18.31	36.50	26.36	75	26.47	36.19	23.80	413.8	.1092	.3503
380	16.33	36.17	26.58	100	24.77	36.29	24.40	357.3	.0964	.4467
542	10.78	35.10	26.91	150	22.26	36.58	25.36	267.9	.1563	.6030
				200	20.21	36.62	25.96	213.0	.1202	.7232
				250	19.00	36.63	26.28	183.7	.0991	.8223
				300	18.37	36.51	26.36	178.1	.0906	.9129
				400	15.60	36.02	26.66	151.2	.1649	1.0778
				500	11.80	35.18	26.90	128.6	.1399	1.2177
				600	(7.60)	(34.99)	27.33	85.9	.1072	1.3249

Cruise T 358 Station T 17 Lat. 25° 38.7' N. Long. 79° 52.7' W.
 Date 23 X 53 Local time 1100 Time Zone +5
 Depth 348 m. Max. sample depth 330 m. Wire angle 10°
 Weather 00 Clouds 0/10 Wind 010 5 Sea 5 Swell North

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn. m.	$\Sigma \Delta D$ dyn. m.
1	27.59	36.00	23.30	0	27.59	36.00	23.30	459.1		.0000
24	27.59	36.00	23.30	10	27.59	36.00	23.30	459.5	.0459	.0459
56	27.56?	35.86	23.20?	20	27.59	36.00	23.30	459.9	.0460	.0919
107	25.88	36.36	24.12	30	27.59	36.00	23.30	460.3	.0460	.1379
136		36.11		50	27.57?	35.91	23.25	466.1	.0926	.2305
220	13.11	35.67?	26.91?	75	27.24	35.88	23.33	459.4	.1157	.3462
288	8.43	34.99	27.22	100	26.42	36.26	23.87	408.9	.1085	.4547
330	7.85	34.98	27.30	150	17.10	36.47	26.63	147.1	.1390	.5937
				200	14.40	36.00	26.98	114.8	.0654	.6591
				250	10.78	35.28	27.05	108.0	.0557	.7148
				300	8.20	34.97	27.24	89.8	.0494	.7642
				400	(7.40)	(35.10)	27.45	71.1	.0804	.8446

Cruise T-358 Station T 18 Lat. 25° 36.6' N. Long. 79° 44.6' W.
 Date 23 X 53 Local time 1215 Time Zone +5
 Depth 786 m. Max. sample depth 444 m. Wire angle 10°
 Weather 00 Clouds 0/10 Wind 010 5 Sea 5 Swell North

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ_t	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1		36.00		0	27.52	36.00	23.33	456.3		.0000
25	27.52	36.03	23.35	10	27.52	36.02	23.34	455.7	.0456	.0456
63	27.47	35.95	23.30	20	27.52	36.03	23.35	455.1	.0455	.0911
122	25.26	36.41	24.35	30	27.52	36.03	23.35	455.5	.0455	.1366
169	21.76	36.63	25.54	50	27.51	36.00	23.33	458.5	.0914	.2280
221	17.52	36.39	26.47	75	27.20	35.93	23.38	454.6	.1141	.3421
332		35.39		100	26.45	36.13	23.77	418.4	.1091	.4512
444	8.65	35.00	27.19	150	23.50	36.59	25.01	301.9	.1800	.6312
				200	18.92	36.59	26.28	182.5	.1211	.7523
				250	15.62	35.90	26.54	158.5	.0852	.8375
				300	12.68	35.56	26.91	123.3	.0704	.9079
				400	9.40	35.17	27.20	96.4	.1098	1.0177
				500	(8.00)	(34.91)	27.22	95.0	.0957	1.1134

Cruise T-358 Station T 19 Lat. 25° 35.6' N. Long. 79° 37.2' W.
 Date 23 X 53 Local time 1420 Time Zone +5
 Depth 823 m Max. sample depth 774 m. Wire angle 15°
 Weather 01 Clouds cu 2 Wind 000° 5 Sea 5 Swell North

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ d	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1		36.01	23.35	0	(27.47)	36.01	23.35	454.2		.0000
15	27.47	36.01	23.35	10	27.47	36.01	23.35	454.6	.0454	.0454
48	27.47	35.99	23.34	20	27.47	36.01	23.55	455.0	.0455	.0909
120	25.11	36.44	24.42	30	27.47	36.01	23.35	455.4	.0455	.1364
191	20.45	36.75	25.99	50	27.47	35.99	23.33	457.7	.0913	.2277
260	17.60	36.37	26.44	75	27.20	35.99	23.42	450.4	.1135	.3412
439	11.16	35.39	27.08	100	26.42	36.19	23.82	443.3	.1080	.4492
611	6.89	34.90	27.39	150	23.22	36.67	25.15	288.0	.1753	.6245
774	5.64	35.11	27.11	200	19.75	36.73	26.17	193.3	.1203	.7448
				250	17.86	36.44	26.43	169.8	.0908	.8356
				300	16.35	36.08	26.51	162.4	.0830	.9186
				400	12.50	35.55	26.94	123.2	.1428	1.0614
				500	9.42	35.18	27.21	97.2	.1102	1.1716
				600	7.02	34.92	27.37	80.9	.0890	1.2606
				700	6.02	34.94	27.52	66.7	.0738	1.3344
				800	(5.49)	(35.16)	27.76	44.8	.0558	1.3902

Cruise T-358 Station T-20 Lat. 25° 31.6' N. Long. 79° 27.1' W.
 Date 23 X 53 Local time 1700 Time Zone +5
 Depth 823 m Max. sample depth 790 m. Wire angle 35°
 Weather 01 Clouds cu 2 Wind 010° 5 Sea 5 Swell North

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1		36.04	23.37	0	27.47	36.04	23.37	452.0		.0000
12	27.47	35.98	23.33	10	27.47	35.99	23.33	456.0	.0454	.0454
40	27.45	36.02	23.36	20	27.46	35.97	23.32	457.6	.0457	.0911
101	25.54	36.40	24.26	30	27.45	35.99	23.34	456.2	.0457	.1368
164	21.90	36.74	25.58	50	27.28	36.04	23.43	448.3	.0904	.2272
224	19.50	36.64	26.16	75	26.88	36.07	23.58	434.9	.1104	.3376
405	15.47	36.01	26.66	100	25.54	36.36	24.22	374.9	.1012	.4388
592	11.95	35.23	26.81	150	22.46	36.69	25.39	265.5	.1601	.5989
790	9.19	34.97	27.08	200	20.62	36.77	25.96	212.8	.1196	.7185
				250	19.20	36.54	26.16	195.3	.1020	.8205
				300	17.88	36.37	26.37	177.0	.0932	.9137
				400	15.56	36.03	26.66	151.8	.1644	1.0781
				500	13.58	35.54	26.71	148.2	.1500	1.2281
				600	11.80	35.21	26.81	139.8	.1440	1.3721
				700	10.34	35.05	26.95	126.8	.1333	1.5054
				800	(9.08)(34.97)		27.10	112.8	.1198	1.6252

Cruise T-362 Station T 21 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 XI 53 Local Time 1300 Time Zone +5
 Depth 348 m Max. sample depth 330 Wire angle 5°
 Weather 03 Clouds St 8 Wind 000° 2 Sea 1 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma_f$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	26.03	35.90	23.72	0	26.03	35.90	23.72	418.3		.0000
83	25.62	36.02	23.96	10	26.03	35.90	23.72	418.7	.0418	.0418
112	23.29	36.29	24.84	20	26.02	35.90	23.73	418.8	.0419	.0837
140	19.07	36.22	25.96	30	26.01	35.90	23.73	418.9	.0419	.1256
169	14.90	35.89	26.70	50	26.00	35.92	23.75	418.1	.0837	.2093
220	9.97	35.22	27.15	75	25.81	35.93	23.85	409.1	.1034	.3127
280	8.23	35.00	27.26	100	24.58	36.18	24.38	359.7	.0961	.4088
330	7.67	34.90	27.28	150	17.58	36.12	26.25	182.8	.1356	.5444
				200	11.45	35.37	27.00	111.6	.0736	.6180
				250	8.89	35.09	27.23	90.2	.0504	.6684
				300	8.00	34.95	27.26	87.9	.0445	.7129

Cruise T-362 Station T 22 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 XI 53 Local Time 1500 Time Zone +5
 Depth 348 m. Max. sample depth 336 m. Wire angle 5°
 Weather 03 Clouds St 8 Wind 000 2 Sea 1 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma_\theta$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	25.73	35.91	23.82	0	25.73	35.91	23.82	408.7		.0000
59	26.08	35.92	23.73	10	25.84	35.91	23.79	412.4	.0411	.0411
83	25.70	35.99	23.90	20	25.92	35.91	23.77	415.1	.0414	.0825
113	23.59	36.30	24.76	30	26.00	35.91	23.74	417.9	.0416	.1241
142	18.36	36.16	26.10	50	26.09	35.91	23.71	421.5	.0839	.2080
171	14.97	35.90	26.70	75	25.88	35.95	23.81	413.3	.1044	.3124
223	10.70	35.34	27.11	100	24.82	36.15	24.28	368.9	.0978	.4102
289	8.47	35.02	27.24	150	17.42	36.09	26.26	181.4	.1376	.5478
336	7.59	34.91	27.30	200	12.38	35.57	26.98	114.0	.0738	.6216
				250	9.50	35.18	27.20	93.4	.0518	.6734
				300	8.45	34.99	27.22	91.8	.0463	.7197

Cruise T-362 Station T 23 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 MI 53 Local time 1700 Time Zone +5
 Depth 330 Max. sample depth 225 m Wire angle 5°
 Weather 03 Clouds St 8 Wind 000 3 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	10 ⁵ σ	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	25.95	35.89	23.74	0	25.95	35.89	23.74	416.6		.0000
83	25.95	36.00	23.83	10	26.08	35.89	23.70	420.9	.0419	.0419
112	23.94	36.27	24.63	20	26.18	35.89	23.67	424.3	.0423	.0842
140	18.29	36.14	26.10	30	26.22	35.89	23.66	425.9	.0425	.1267
170	14.72	35.86	26.71	50	26.29	35.90	23.64	428.2	.0854	.2121
225	10.91	35.24	27.00	75	26.10	35.96	23.75	419.2	.1059	.3180
				100	25.04	36.14	24.21	376.0	.0994	.4174
				150	16.69	36.05	26.41	167.5	.1359	.5533
				200	12.56	35.51	26.89	121.9	.0724	.6257
				250	(9.55)	(35.09)	27.12	100.7	.0556	.6813

Cruise T-362 Station T 24 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 XI 53 Local time 1900 Time Zone +5
 Depth 348 m. Max. sample depth 300 m. Wire angle 20°
 Weather 03 Clouds St 8 Wind 000° 4 Sea 3 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	26.74	35.97	23.55	0	26.74	35.97	23.55	434.7		.0000
52	26.14	35.94	23.73	10	26.63	35.96	23.58	432.5	.0434	.0434
74	25.91	35.95	23.80	20	26.48	35.96	23.63	428.3	.0430	.0864
100	24.82	36.25	24.36	30	26.34	35.95	23.66	425.2	.0427	.1291
126	21.65	36.31	25.34	50	26.15	35.94	23.72	421.1	.0846	.2137
152	18.26	36.21	26.16	75	25.88	35.95	23.81	413.3	.1043	.3180
199	14.81	35.87	26.71	100	24.83	36.25	24.36	362.0	.0969	.4149
258	11.12	35.39	27.09	150	18.45	36.22	26.11	196.4	.1396	.5545
300	8.61	35.02	27.22	200	14.77	35.87	26.71	140.0	.0841	.6386
				250	11.65	35.46	27.03	110.1	.0625	.7011
				300	8.61	35.02	27.22	92.0	.0505	.7516

Cruise T-362 Station T 25 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 XI 53 Local time 2100 Time Zone
 Depth 348 m. Max. sample depth 280 m Wire angle 15°
 Weather 03 Clouds St 8 Wind 000 4 Sea 4 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta^n$ dyn.m.
				0	26.49	(36.05)	23.70	421.4		.0000
55	26.41	36.04	23.72	10	26.49	-	-	-	.2106	-
78	26.30	36.00	23.72	20	26.45	-	-	-	-	-
105	25.18	36.17	24.20	30	26.43	-	-	-	-	-
132	22.28	36.34	25.18	50	26.41	36.05	23.72	421.0	-	.2106
159	18.68	36.19	26.04	75	26.33	36.00	23.70	423.2	.1055	.3161
195	14.41	35.81	26.75	100	25.52	36.12	24.05	391.5	.1018	.4179
280	9.42	35.13	27.17	200	14.12	35.77	26.77	133.8	.0908	.6639
				250	11.03	35.35	27.06	106.6	.0601	.7240
				300	(8.60)	(35.00)	27.20	93.3	.0500	.7740

Cruise T-362 Station T 26 Lat. 25° 40' N. Long. 79° 57' W.
 Date 10 XI 53 Local time 2300 Time Zone +5
 Depth 348 m Max. sample depth 327 m. Wire angle 5°
 Weather 03 Clouds St 8 Wind 000 5 Sea 4+ Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
				0	26.50	(36.00)	23.65	425.3		.0000
57	26.14	35.97	23.75	10	26.50	(35.99)	23.64	426.8	.0426	.0426
81	25.49	36.09	24.04	20	26.50	(35.98)	23.64	427.5	.0427	.0853
137	21.03	36.31	25.50	30	26.48	(35.97)	23.64	428.0	.0428	.1281
161	15.82	35.97	26.55	50	26.29	35.96	23.69	423.9	.0852	.2133
217	11.97	35.48	27.00	75	25.69	36.00	23.91	403.4	.1034	.3167
282	9.26	35.11	27.18	100	24.35	36.15	24.43	355.2	.0948	.4115
327	7.73	34.91	27.28	150	17.61	36.14	26.26	182.1	.1343	.5458
				200	12.85	35.61	26.91	120.3	.0756	.6214
				250	10.46	35.27	27.10	102.8	.0558	.6772
				300	8.63	35.03	27.22	91.6	.0486	.7258

Cruise T-364 Station T 27 Lat. 25° 43' N. Long. 79° 57' W.
 Date 24 XI 53 Local time 1015 Time Zone +5
 Depth 310 m Max. sample depth 270 m Wire angle 40°
 Weather 02 Clouds cu 02 Wind 165 2 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
0	26.40	36.15	23.80	0	26.40	36.15	23.80	411.4	.0411	.0000
23	26.40	36.17	23.81	10	26.40	36.17	23.81	410.4	.0411	.0411
64	25.53	36.34	24.22	20	26.40	36.17	23.81	410.8	.0411	.0822
85	24.72	36.18	24.35	30	26.35	36.16	23.82	410.5	.0411	.1233
105	23.49	36.21	24.72	50	26.20	36.10	23.82	411.1	.0822	.2055
124	18.26	36.17	26.13	75	25.15	36.19	24.22	374.4	.0982	.3037
150	14.28	35.85	26.80	100	23.81	36.21	24.64	335.6	.0888	.3925
220	9.82	35.29	27.23	150	14.28	35.85	26.80	130.0	.1164	.5089
270	8.54	34.97	27.19	200	10.63	35.40	27.17	95.0	.0562	.5651
				250	8.92	35.07	27.21	92.2	.0468	.6119
				300	(7.90)	34.89	27.22	90.9	.0458	.6577

Cruise T-364 Station T 28 Lat. 25° 40.6' N. Long. 79° 45.7' W.
 Date 24 XI 53 Local time 1235 Time Zone +5
 Depth 786 m. Max. sample depth 555 m. Wire angle 45°
 Weather 01 Clouds Cu 3 Wind 170 3 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS					
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m. $\Sigma \Delta D$ dyn.m.
1	26.65	36.08	23.66	0	26.65	36.08	23.66	424.0	.0000
36	26.65	36.11	23.69	10	26.65	36.10	23.68	423.0	.0423
70	26.59	36.07	23.68	20	26.65	36.12	23.69	422.0	.0423
103	24.65	36.33	24.42	30	26.65	36.12	23.69	422.4	.0846
136	23.90	36.25	24.64	50	26.65	36.08	23.66	426.1	.0422
232	17.66	36.29	26.37	75	26.38	36.08	23.75	418.9	.1268
323	11.76	35.49	27.04	100	24.97	36.31	24.36	361.7	.0848
438	8.68	35.00	27.20	150	23.40	36.52	24.99	303.7	.1056
555	6.60	34.84	27.39	200	20.61	36.48	25.74	233.1	.1664
				250	15.94	36.09	26.62	151.0	.1343
				300	12.71	35.63	26.96	118.9	.0961
				400	9.64	35.12	27.13	103.2	.8116
				500	7.50	34.88	27.27	89.1	.0675
				600	(6.20)	(34.85)	27.43	74.6	.1110
									.0962
									1.0863
									.0818
									1.1681

Cruise T-364 Station T 29 Lat. 25° 40.2' N. Long. 79° 26.6' W.
 Date 24 XI 53 Local time 1630 Time Zone +5
 Depth 695 m Max. Sample depth 684 m Wire angle 10°
 Weather 02 Clouds Cu 7 Wind 180 3 Sea 2 Swell 0

OBSERVED VALUES				VALUES AT STANDARD DEPTHS						
Depth m	Temp. °C	Sal. ‰	σ_t	Depth m	Temp. °C	Sal. ‰	σ_t	$10^5 \sigma$	ΔD dyn.m.	$\Sigma \Delta D$ dyn.m.
1	26.70	36.09	23.66	0	26.70	36.09	23.66	424.8	.0428	.0000
9	26.70	36.00	23.59	10	26.70	36.00	23.59	431.7	.0433	.0428
58	26.66	36.07	23.76	20	26.70	35.96	23.56	435.0	.0435	.0861
105	26.05	36.39	24.09	30	26.70	35.96	23.56	435.4	.0861	.1296
197	20.14	36.63	25.98	50	26.50	36.02	23.66	426.0	.1044	.2157
287	17.34	36.41	26.53	75	26.31	36.18	23.85	409.6	.1003	.3201
469	12.34	35.46	26.91	100	26.15	36.36	24.03	393.0	.1678	.4204
684	8.28	34.97	27.23	150	22.66	36.59	25.26	270.2	.1214	.5882
				200	20.02	36.63	26.02	207.5	.0957	.7096
				250	18.42	36.55	26.37	175.3	.0829	.8053
				300	16.94	36.35	26.58	156.4	.1464	.8882
				400	14.00	35.78	26.81	136.4	.1294	1.0346
				500	11.55	35.35	26.96	122.4	.1151	1.1640
				600	9.54	35.09	27.12	107.8	.0934	1.2791
				700	(7.04)	(34.97)	27.41	79.0		1.3725

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